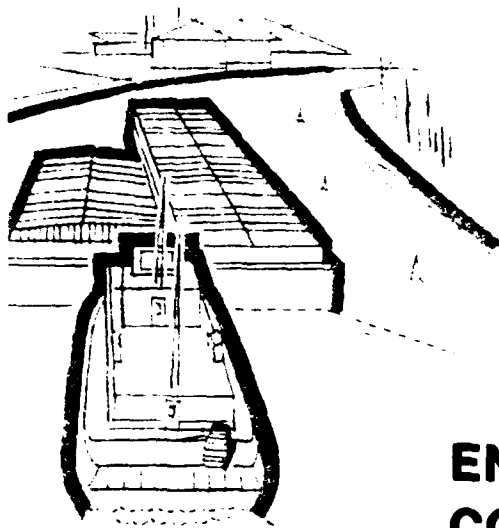


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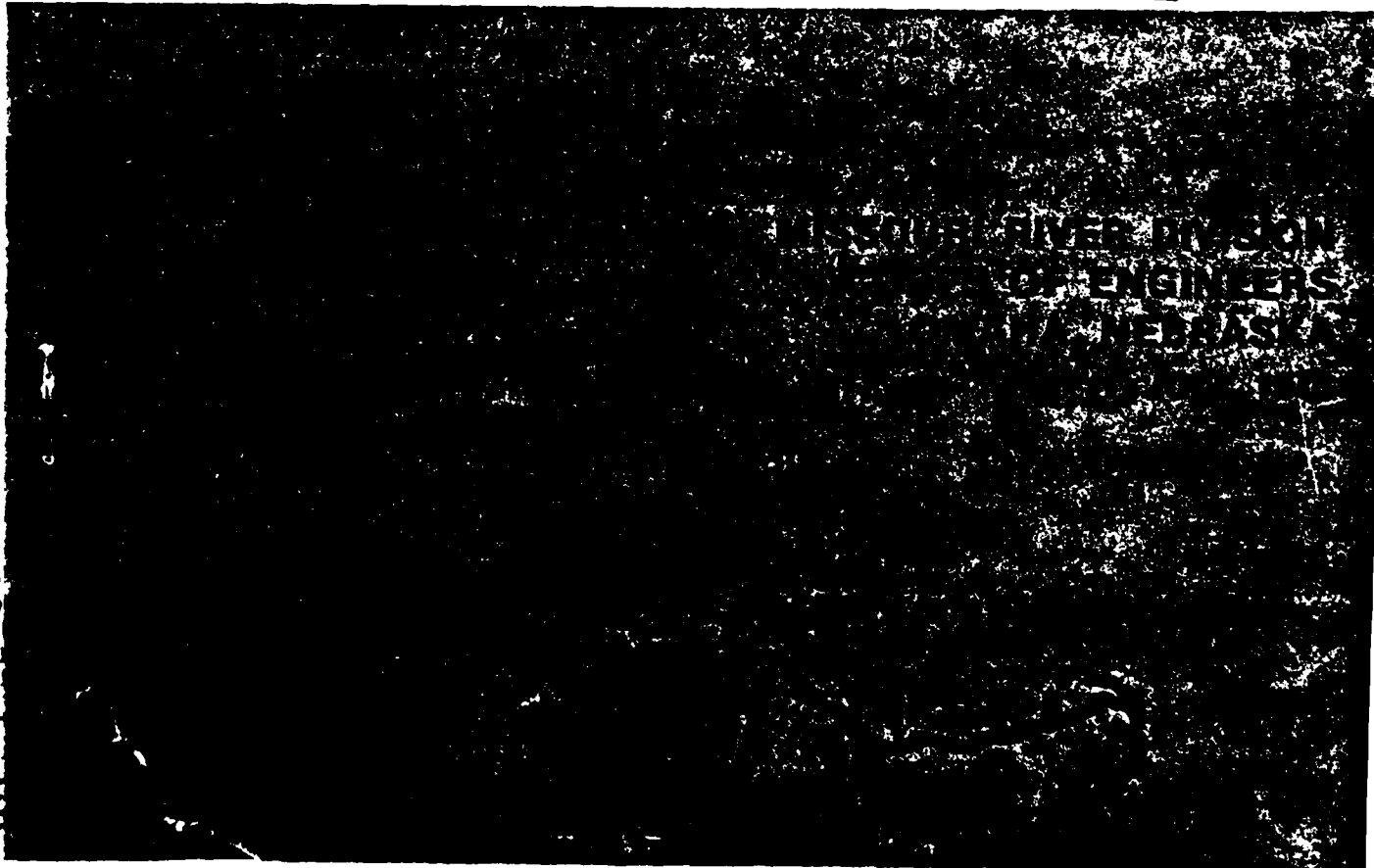
MISSOURI RIVER BANK STABILIZATION AND NAVIGATION PROJECT

FINAL ENVIRONMENTAL STATEMENT CONTINUING CONSTRUCTION AND MAINTENANCE

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MISSOURI RIVER DIVISION
OF ENGINEERS
NEBRASKA

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SYLLABUS

Work to stabilize the banks of the Missouri River and to develop its channel for navigation has been underway for 60 years. The channel is now aligned in a predetermined course from Sioux City, Iowa, to its mouth. The authorized channel depth and width have essentially been attained throughout the project reach of the river. The remaining new construction consists of building a few more structures, mainly in the lower 250 miles of the river, which will complete development of the bank stabilization and navigation project. Maintenance work, which will continue throughout the life of the project, will consist of repair of structures and the addition of occasional new structures to replace construction materials removed by water action and other causes, and to adjust to changing river conditions, respectively. Structure maintenance will be supplemented by occasional dredging to assist in retention of the river channel's full navigational dimensions.

Construction of approved river recreational access sites will continue to occur after bank stabilization and navigation development is complete. Individual sites will be built whenever non-Federal sponsors furnish necessary lands to accommodate the development and agree to execute a cost sharing contract for development and for operation and maintenance of the development.

The scope of this EIS is limited to the identification and discussion of impacts of the remaining work, including maintenance, and their effects on the environment of the project area. The statement does not address the impacts and effects of all the work of bank stabilization and navigation that has taken place over the past 60 years.

In addition, this EIS does not present the impacts and effects of related Federal actions in the project area such as issuance of regulatory permits by the Corps of Engineers and Environmental Protection Agency or U. S. Coast Guard activities. This statement does not address Federal activities outside of the project area which are indirectly related to the operation of this project such as the operation of the Missouri River main stem dam system or the other inland waterways. These Federal actions which have been, or which may be, found significant under the context of NEPA are properly the subject of separate environmental impact statements.



SUMMARY
MISSOURI RIVER BANK STABILIZATION
AND NAVIGATION PROJECT, SIOUX CITY, IOWA
TO THE MOUTH

() Draft

(X) Final

Responsible Office: U. S. Army Engineer Division, Missouri River
Omaha, Nebraska
Brigadier General William E. Read
P. O. Box 103, Downtown Station, Omaha, NE 68101
AC 402/221/7279

1. Name of Action: (X) Administrative () Legislative

2. Description of the Action: To complete construction of bank stabilization and navigation structures to achieve authorized design channel configuration and continuation of maintenance of the Missouri River Bank Stabilization and Navigation Project.

3. a. Environmental Impacts of the Remaining Construction and Maintenance Program. (1) Rock added to the river's environmental setting. (2) Fine sand and associated material removed from the river bed in certain locations. (3) Fine sand and associated river bed material added to the river channel waters downstream of the removal sites. (4) Encroachment on certain flood plain land and river bank reaches by placement of recreation access facilities.

b. Adverse Environmental Effects. (1) Not allowing the river to remove accreted lands thereby adding shallow, quiet water areas (important aquatic habitat) and low, marsh lands on which volunteer riverine vegetation would develop (valuable wildlife habitat). (2) Accretion of sediment which ultimately can reduce surface water area (shallower water areas important for aquatic life) and possibly cover up existing marsh areas with their riverine vegetation (valuable wildlife areas). (3) Possible destruction of archaeological resources by quarry operations. (4) Alteration of established attached, algal and invertebrate communities on old rock of river structures, and also reduce for a short period of time the structures' value as fish cover (during reconstruction-maintenance-and shortly thereafter).

4. Alternatives to the Present Continuing Construction and Operation and Maintenance Program. (a) Terminate existing and future Federal action. (b) Terminate navigation function, but retain the bank stabilization function. (c) Modification of the project structure design.

5. Comment Received.

Advisory Council on Historic Preservation
Bureau of Indian Affairs
Department of Health, Education and Welfare
Department of Housing and Urban Development
Department of Interior, Missouri Basin Region
Environmental Protection Agency
Federal Power Commission
Forest Service, Colorado and Pennsylvania
Geological Survey
National Oceanic and Atmospheric Administration
(National Weather Service)
Soil Conservation Service, Iowa, Kansas, Missouri, Nebraska
United States Coast Guard
Boonslick Regional Planning Commission
Iowa Conservation Commission
Iowa Department of Transportation
Kansas Water Resources Board
Missouri Department of Conservation
Missouri Department of Natural Resources
Nebraska Office of Planning and Programming
Omaha-Council Bluffs Metropolitan Area Planning Agency
St. Charles, Missouri
St. Joseph, Missouri
Siouxland Interstate Metropolitan Area Planning Council
Executive Committee Western Railroad Traffic Association
Missouri Chapter of the American Fisheries Society
The American Waterways Operators, Inc.
Thomas A. Milne

6. Draft Statement filed with CEQ 14 May 1976.
Final Statement filed with CEQ 15 JANUARY 1977

FINAL ENVIRONMENTAL STATEMENT
REMAINING CONSTRUCTION AND MAINTENANCE
MISSOURI RIVER BANK STABILIZATION
AND NAVIGATION PROJECT,
SIOUX CITY, IOWA TO MOUTH

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FINAL ENVIRONMENTAL STATEMENT
REMAINING CONSTRUCTION AND MAINTENANCE
MISSOURI RIVER BANK STABILIZATION
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SECTION I - DESCRIPTION OF THE PROJECT

1.01. Action. The action is to complete construction of bank stabilization and navigation structures to achieve authorized design channel configuration, and continuation of the present method of maintenance of the Missouri River Bank Stabilization and Navigation Project.

1.02. Authorization. The current Missouri River Bank Stabilization and Navigation Project was authorized by the River and Harbor Act of 1945 in accordance with House Document 214, 76th Congress, 1st Session, 1939. This authorization provides for a continuous 9-foot navigation channel, 300-foot wide from Sioux City, Iowa to the Mouth. The Act extended the navigation limits and modified earlier Congressional authorizations in 1912 and 1927 that had provided for a 6-foot deep, 200-foot wide navigation channel.

1.02.1. Authorization for development of non-reservoir recreation areas, including this project, is contained in Section 207 of the Flood Control Act of 1962, an amendment of Section 4 of the Flood Control Act of 1944. The current project was less than 60% complete as of August 1958; therefore, making the Fish and Wildlife Coordination Act of 1958 applicable.

1.03. Project Purpose. The Missouri River Bank Stabilization and Navigation Project is a multi-purpose river development project. Project functions include navigation, bank stabilization, and recreation.

1.04. Project Location. The Missouri River Bank Stabilization and Navigation Project is located on the Missouri River from the mouth of the river to Sioux City, Iowa, a distance of 734.8 miles. (Fig. 1).

1.05. Project Construction Status. As of January 1977 the project was 92% complete, with scheduled completion in September 1985. Remaining work consists of constructing a few additional stabilization structures. In addition, 56 of the initially approved 67 recreation access sites remain to be constructed.

FIGURE 1

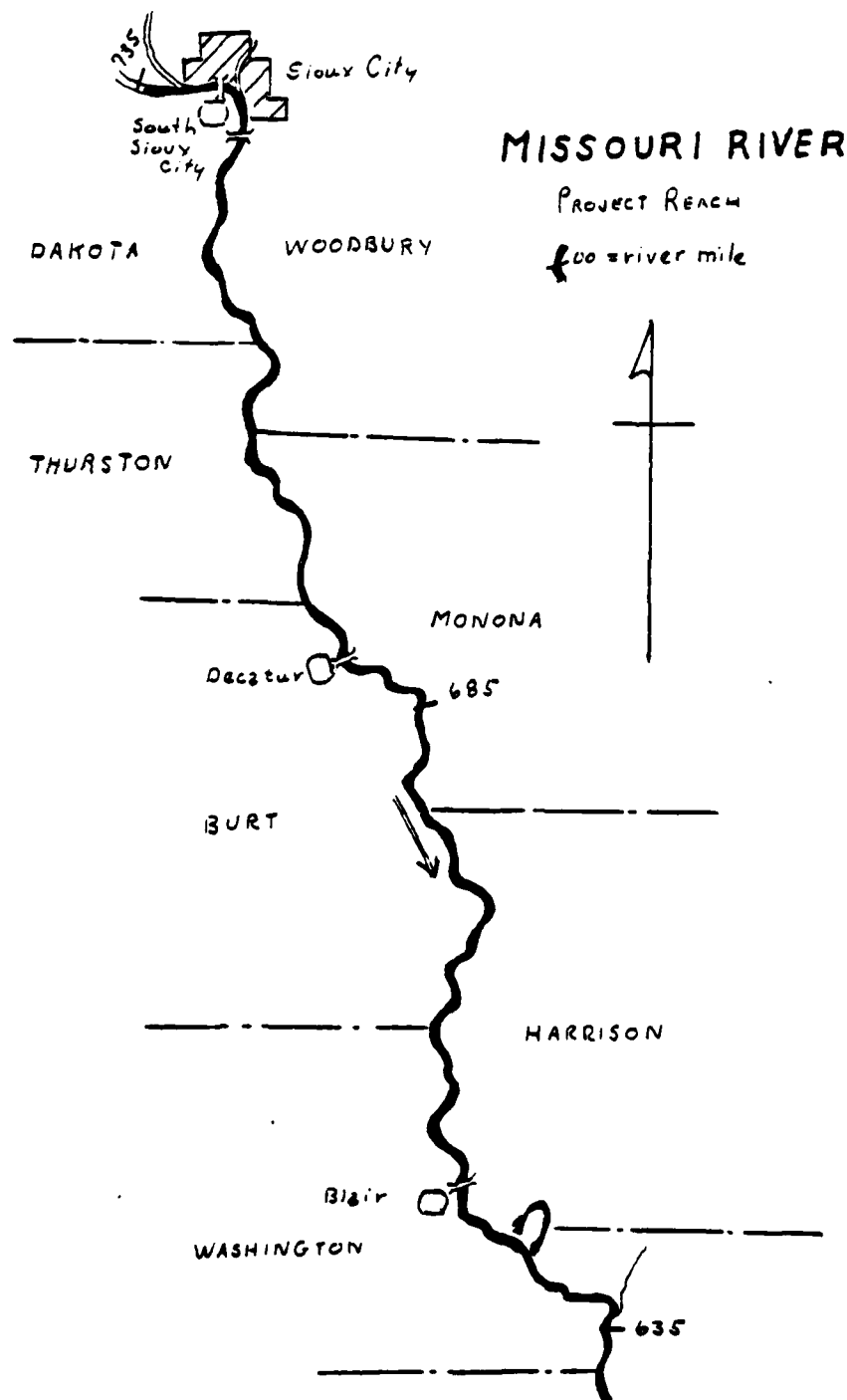


FIGURE 1

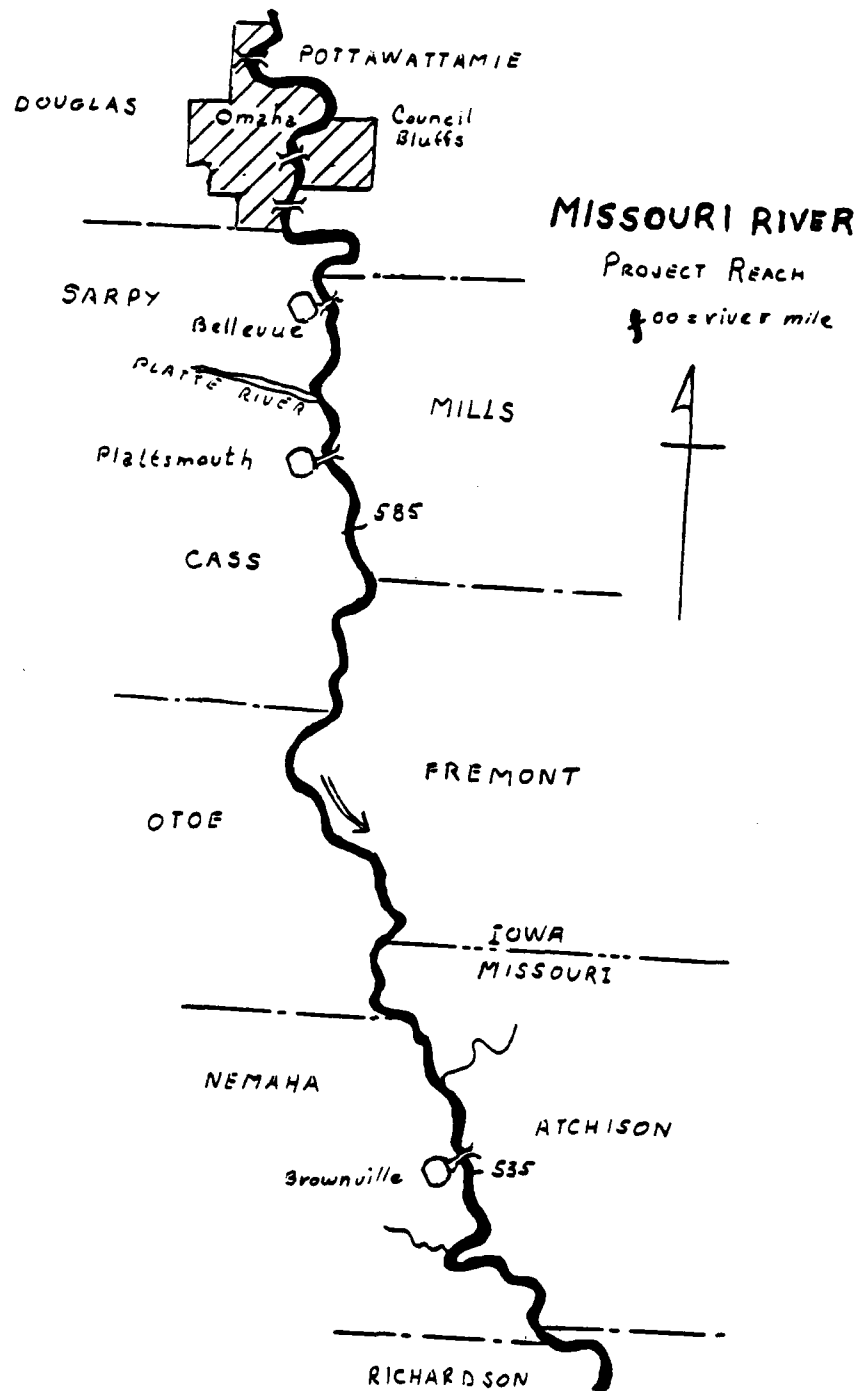


FIGURE 1

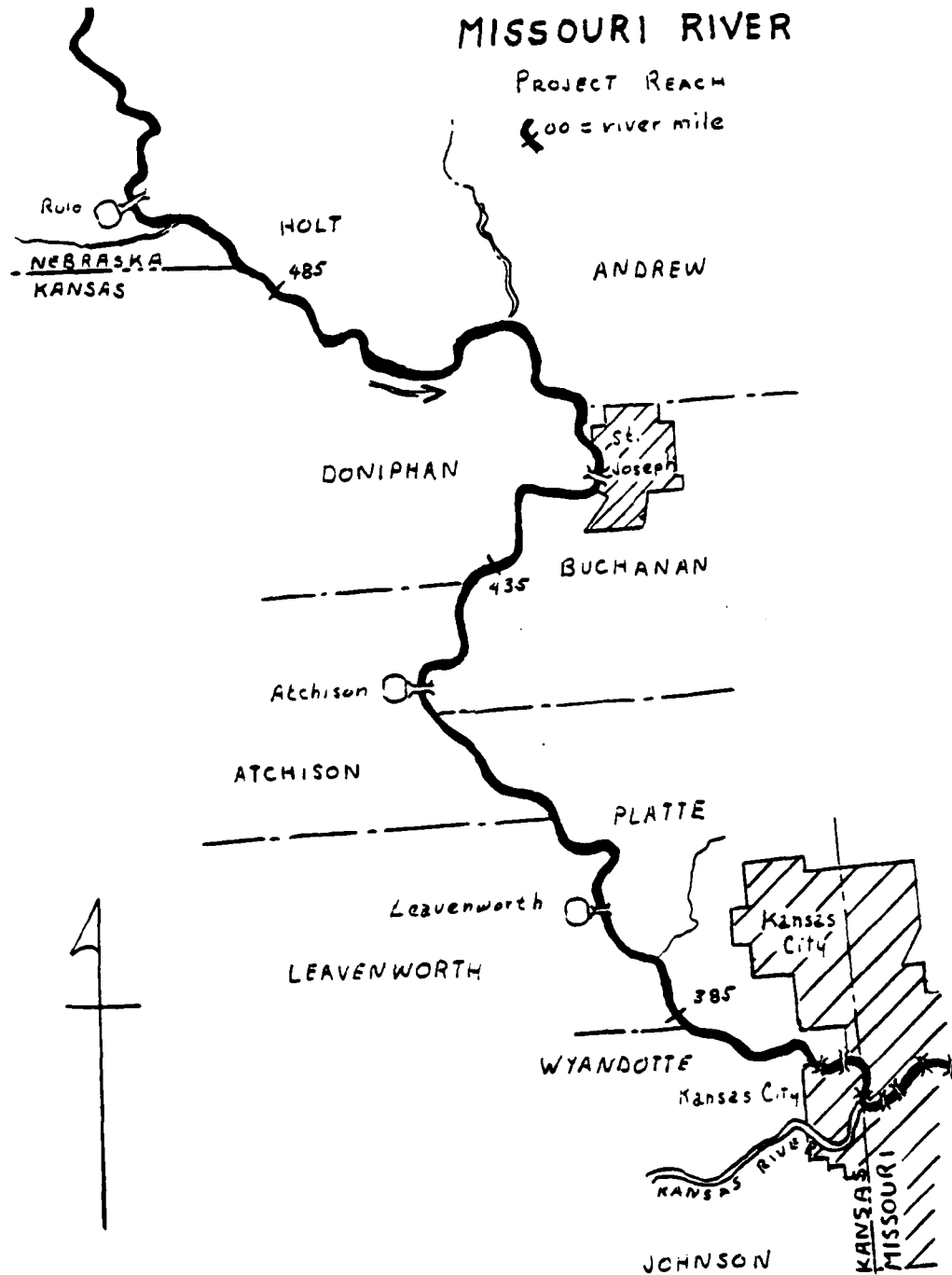


FIGURE 1

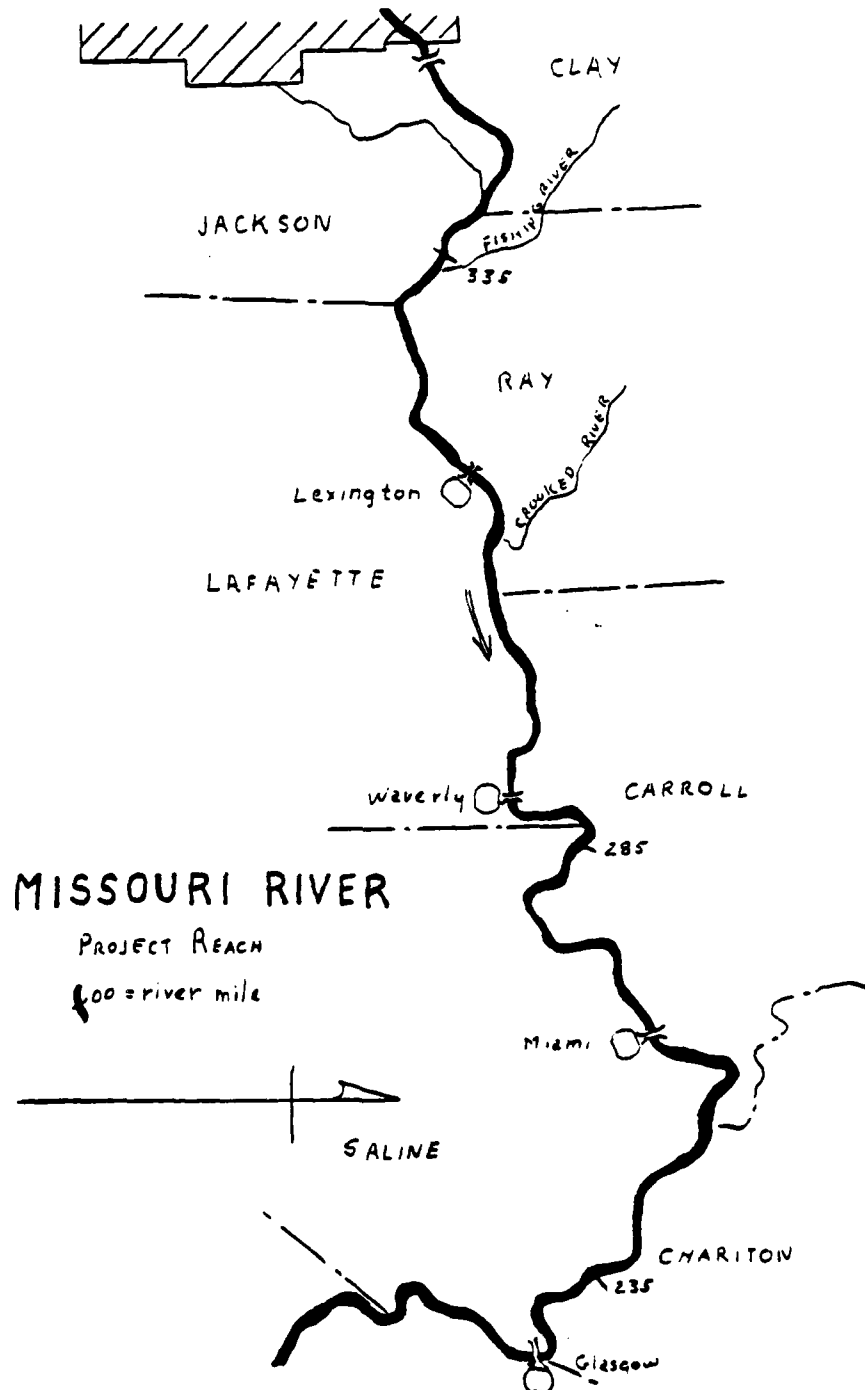


FIGURE 1

MISSOURI RIVER

PROJECT REACH
100 = RIVER mile

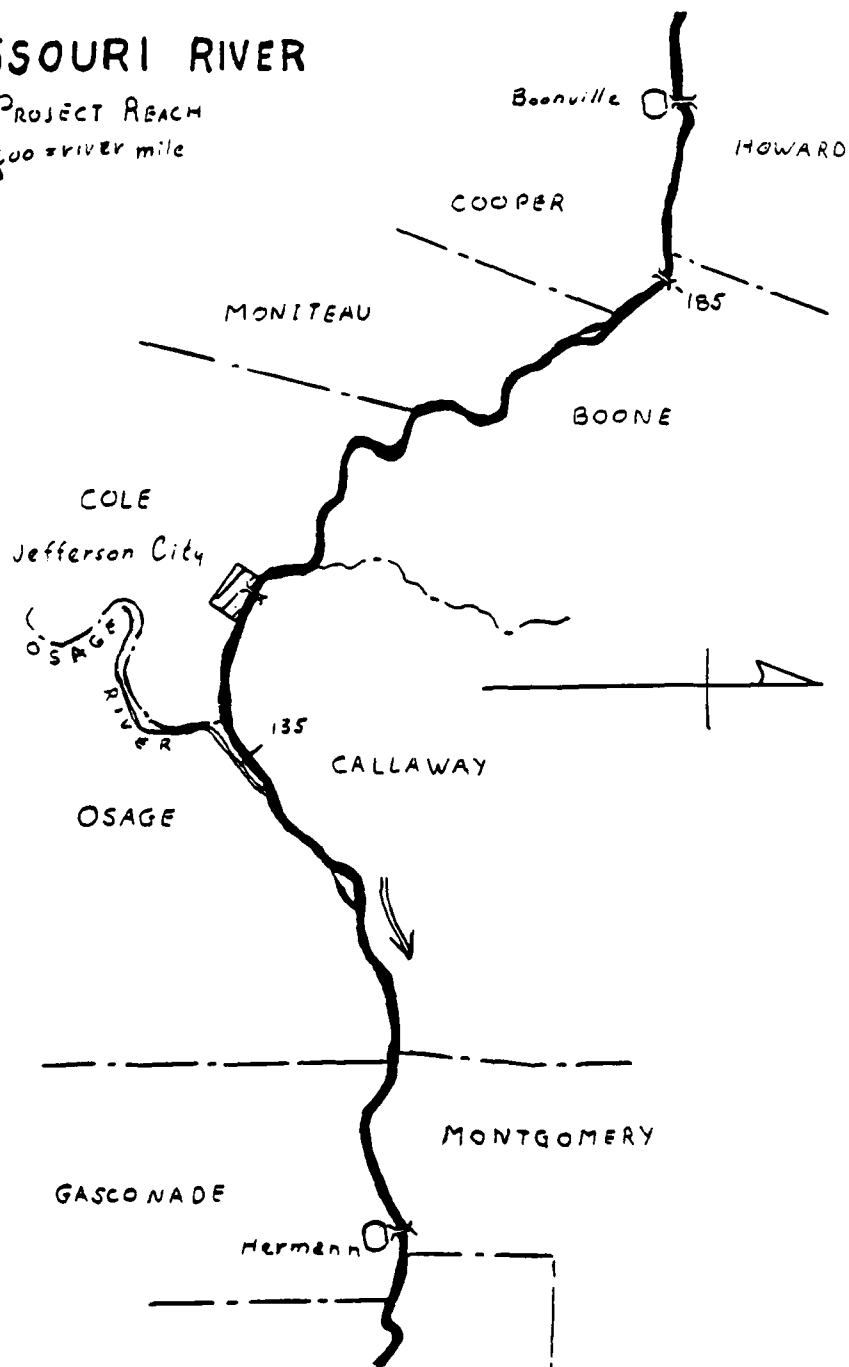
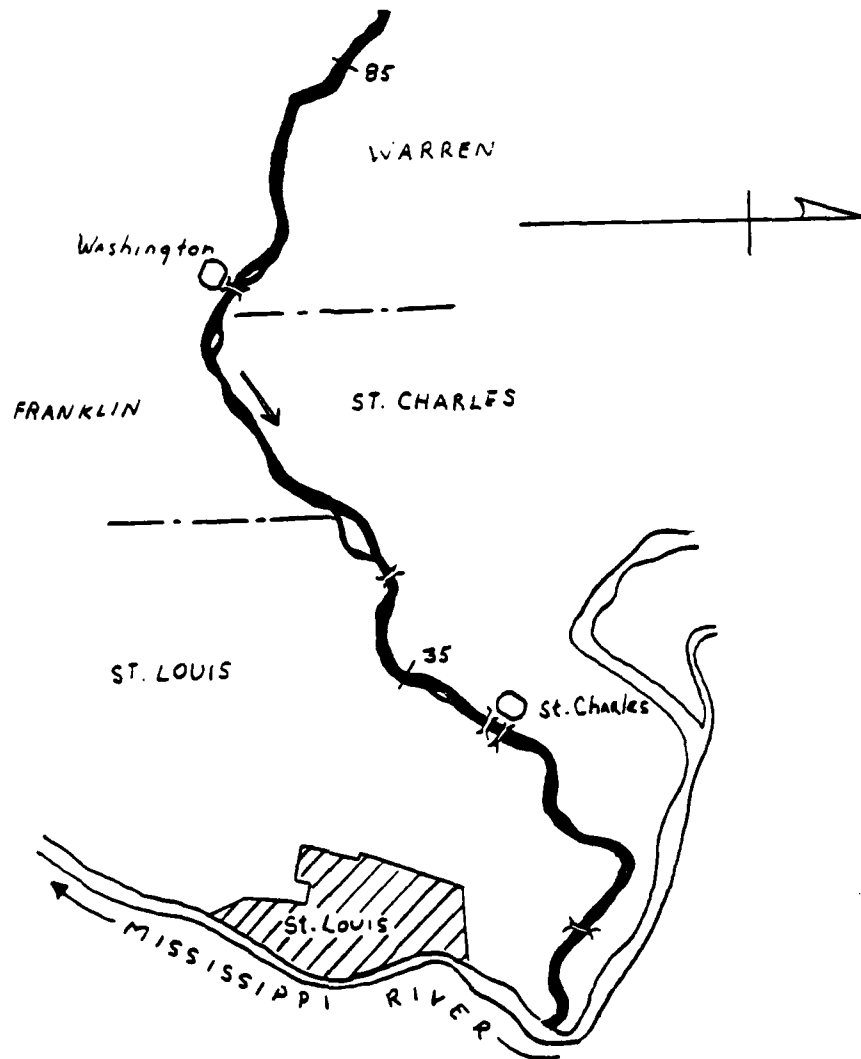


FIGURE 1



MISSOURI RIVER

PROJECT REACH
100 = river mile

1.06. Project Dimensions. The navigation design of the project is of the open-river, regulation-type which utilizes the energy of the flowing water to develop and maintain the navigation channel area. The navigational goal is to provide a navigational channel within the overall river with a depth of nine feet and width of 300 feet from Sioux City, Iowa, to the river mouth. These navigation dimensions now exist throughout most of the project with a stabilized river width ranging from 600 feet at Sioux City, to 1,100 feet at the mouth. The magnitude of the recreation access points and areas typically include boat ramps, parking, access roads, day use facilities and sanitary facilities. Initial recreation development must be cost-shared by a sponsor who also must furnish all necessary land and agree to operate and maintain the site.

1.07. Project Economics. The total Federal first cost is estimated to be \$450,000,000 upon completion of the project. The total non-Federal first cost after completion of the project is estimated to be \$6,799,000. Commercial interests have spent about \$53,700,000 for the construction of terminal and transfer facilities necessary to the navigation industry of the river.

The benefit to cost ratio as of Fiscal Year 1976 is 1.6.

* Average annual economic benefits:

Bank stabilization benefits	\$34,932,300
Navigation benefits	6,534,000
Recreation	<u>1,815,000</u>
Total	\$43,281,300

* Average annual cost:

Interest (@ 2-1/2%) & amortization	12,475,200
Annual maintenance	<u>14,260,000</u>
Total	\$26,735,200

* Economic data has been extracted from U. S. Army Corps of Engineers files. Complete information is available from U. S. Army Engineer Division, Missouri River, Omaha, NE.

1.08. Bank Stabilization and Navigation Structures. Present-day structures basically utilize rock fill in their construction and consist of dikes, revetments, and sills. Many older structures constructed prior to 1950 utilized wood piling with rock fill around them. Over the years these have been repaired with rock fill, and as a result the original piling construction is decreasingly in evidence.

1.08.1. Dike structures extend from the bank into the river,

perpendicular or nearly perpendicular to the flow. They constrict the river channel to the desired width and protect the bankline on their lee sides from erosion. Some of the dikes constructed in the early days of this project were several thousand feet long, extending from near the bluffs out to the desired channel location. These dikes cut off side channels and chutes, thereby concentrating the river flow into a single channel. Once the flow was confined, additional shorter dikes were spaced intermittently around the insides of the bends to insure that the main flow remains against the outsides of the bends. Sometimes a short segment of revetment is attached to the riverward end of a dike, extending downstream parallel with the flow. This type of structure is called an L-head dike. The present dike systems insure a continuous, self-scouring channel of suitable navigation depth. There are, on the average, six dikes per river mile, in the present stabilized river channel from Sioux City to the mouth.

1.08.2. Revetment structures are constructed parallel to the flow, either to establish and protect a desired bankline or to guide the flow along a desired alignment. Revetments may be (a) a layer of rock constructed directly on the original river bank, or (b) constructed in an excavated trench landward of the original river bank with the expectation that the river bank will eventually erode back to the desired alignment established by the revetment, or (c) a rock fill along a desired alignment riverward of the original river bank. Today very little of the trench-type revetment is in evidence because the banks in nearly every case have eroded back to the constructed alignment. Much of the rock fill revetment originally constructed riverward of the bank is now integral with the bank due to the build-up of sediment deposits landward of the structure. Some of the rock-fill revetment still has open water on the landward side. This is especially true of the revetment segments at the ends of L-head dikes and of kicker structures. A kicker structure is a downstream extension of the revetment on the outside of a bend, designed to direct the flow into the next bend. In the upstream 250 miles of the project about 50 percent of the bankline along the outsides of the bends is revetted. In the lower portion of the project only about 40 percent is revetted.

1.08.3. Sills are low elevation extensions into the river channel off the ends of dikes. Sills are constructed approximately perpendicular to the flow at elevations that are submerged during the navigation season. Sills are designed to control the shape of the river cross section in order to maintain navigation depths in the desired position within the section.

1.08.4. The basic river channel width bounded by revetments and the ends of dikes varies from 600 feet at Sioux City to 1,100 feet at St. Louis. The underwater sills extend into the channel an additional 100 to 200 feet. Eddy-erosion scallops upstream and downstream from dikes and open water behind L-head dikes and kicker

structures account for additional water areas adjacent to the channel.

1.08.5. The tops of sills are down to five feet below the normal water surface during the navigation season. The other types of navigation and bank stabilization structures vary in height from about the normal water surface to six feet above. Variations in river stage above the normal level result in these structures being submerged between 50 percent and 80 percent of the time during the navigation season. All structures are below the high river bank.

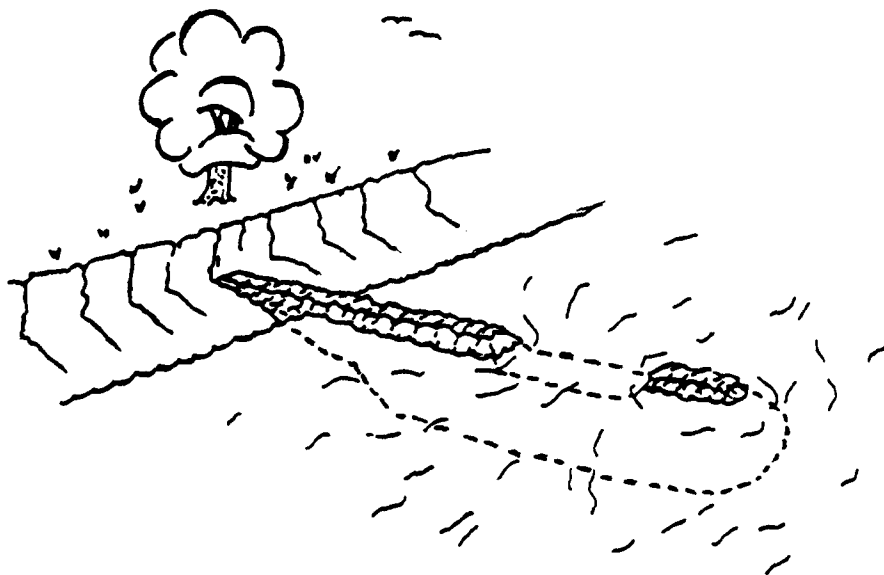
1.08.6. Bank revetments are constructed by sloping the river bank above the normal water surface to about 1 on 2 (vertical to horizontal) and placing on the slope a layer of stone 12 to 24 inches in thickness. Below water, a thickened toe of rock provides a reservoir of stone that can slump and protect the revetment from undercutting in case the river scours its bed adjacent to the bank. Dikes and rock fill revetments are trapezoidally shaped stone fills resting on the river bottom. The cross section is approximated by a 3- to 5-foot top width and 1 on 1-1/4 to 1 on 1-1/2 side slopes. Sills have a flatter, more irregular cross section with a crest at the desired level. The stone used in construction and maintenance of all structures is quarried limestone, except for a small amount of quarried quartzite near Sioux City, Iowa. The individual stones are angular and chunky in shape and are mixed in a continuous graduation of sizes ranging from 400 to 2,000 pound pieces down to a minimum size such that only 5 percent of the weight of stone is smaller than 3/4 to 3 inches. The quarried limestone is durable where it is continuously under water, but is subject to disintegration by weathering where it is exposed to alternate wetting and drying and freezing and thawing. As a consequence, the riverward faces of the structures, within the elevation band that is subject to the variable river stages, gradually deteriorate from weathering action, aggravated by wave wash from river traffic in the navigation season and gouging by ice in the winter.

1.08.7. At present, nearly all construction and repair of dikes, revetments, and sills are accomplished from barges. Access to land is usually not required except for surveying to establish control for structure alignment. Occasional exceptions are the wintertime repair of revetments while the river is frozen, in which case work is done from the land side in locations where road access and construction right-of-way are available. Usually, the rock and all construction equipment are on barges moored in the river along the desired structure alignment. The rock is placed in the structure with bulldozers, high loaders or drag lines operated on the barges. The bulk of the stone ends up either in place on the structure or on the river bed where it reinforces the toe of the structure. Since the stone specifications limit fine material to less than 5 percent, only a negligible quantity is entrained by the flow and carried down the river. The rock is barged to construction sites from a few central rock loading points along the river. Rock is

usually transported by truck from the quarry to the rock loading site.

1.08.8. Since 1975, the Corps of Engineers has developed a "riverine habitat and floodway restoration" program for the river within the project area. The objective of the program is to arrest further loss of water area due to structures and to restore some water area recently lost to accretion behind structures. The program consists of modifying old structures, revising design criteria for new structures and adopting maintenance procedures that will ultimately result in old structures conforming to the new design criteria. A large number of structures are being modified by the construction of "environmental" notches. Notches are also being incorporated into the design of many new structures. Notches are openings in structures extending below the normal navigation water level which permits river water to flow through and behind the structure. Figure 2 is a sketch of a typical environmental notch in a dike. Use is also being made of structures known as "rootless" dikes and "vane" dikes which do not tie to the river bank; their landward ends are normally 50 to 300 feet riverward from the bank. Nearly all new structures and structures being reconstructed are being built to an elevation below normal navigation stage, which is less than previous design heights. Exceptions to this are structures which if lowered in height would become navigation hazards.

FIGURE 2



1.09. Remaining Construction. This is to be interpreted to mean the addition of wholly new structures and additions to existing structures for the purpose of achieving the authorized navigation channel dimensions. This work will also complete the stabilization of the river banks. About 50 new structures will be constructed, primarily in the lower one-third of the project, on the inside of some bends to stabilize the navigation channel, and on the outside of some bends to stabilize the bank and provide a more uniform channel and bank alignment. In addition, approximately eighty structures, also primarily in the lower one-third of the project, will be modified by the addition of either L-heads or sills.

1.09.1. There will be as many of the remaining approved recreation access sites built prior to project completion as there will be non-Federal sponsors who will execute a contract with the Federal Government to cost share in the development, and also agree to operate and maintain the facility. It is to be noted, however, that construction of new recreation access sites can continue throughout the life of the project, dependent upon approved non-Federal sponsorship.

1.10. Maintenance of the Project. River behavior determines, to a large degree, maintenance needs. Rock dikes and revetments deteriorate because of ice, freeze-thaw action and wave action, and undercutting by bad scour. Dikes protecting cutoff lakes, or closing off channel chutes wash out from overtopping during high flows. In addition, since the Missouri River is a shifting, sand bed stream, evolving channel conditions can act adversely on the project's authorized navigation dimensions. Maintenance of the project, therefore, necessarily includes placement of occasional new structures to retain the established and authorized channel dimensions, occasional dredging to remove limited amounts of aggregated material, and reconstruction of existing structures.

1.10.1. Total expenditures for operation and maintenance of the project vary from year to year depending on river behavior and upon the budgetary allowances. Annual maintenance schedules are developed on the basis of need and the various components of this schedule are prioritized. In this way budgetary constraints can be addressed realistically and the authorized project purposes achieved. Operation and maintenance activities are grouped into five categories:

- (1) Structure Repair and Maintenance, including occasional additional construction.
- (2) Condition and Operation Studies.
- (3) Engineering and Design Programs.
- (4) Dredging.
- (5) Support Programs.

1.10.2. Structure Repair and Maintenance involves reconstructing degraded structures to the desired grade and alignment by employing the construction methods described in paragraphs 1.08.7 and 1.08.8, as appropriate. Most repair work is contracted to private construction

companies, with the Corps administering the contracts. The Corps utilizes Government employees to perform various small construction jobs in instances where reasonable contract bids would be difficult to obtain due to the high cost of mobilization and demobilization, and in certain emergency cases where there is not time for contract negotiation procedures. These work forces are stationed at three Area Office at Omaha, Nebraska, and Glasgow and Napoleon, Missouri. New structures and additions to existing structures necessary for maintenance of the project will be in accordance with requirements of Sections 313 and 404, PL 92-500, as amended; maintenance of existing structures, however, is not subject to Section 404 of the Act.

1.10.3. Condition and operation studies include collection and analysis of water quality samples, suspended sediment samples, bed material samples, velocity measurements, discharge measurements, and water surface profiles. Hydrographic surveys are made periodically to define water depth patterns, river channel cross sections, and banklines. Frequent inspection trips by boat also detect hazards to navigation, such as snags, shoals, submerged bars and narrow channels. This information is used to update the U. S. Coast Guard's Notice to Navigators, copies of which are placed in "information boxes" located along the river where they are accessible to the pilots of commercial and pleasure river craft. Structures with environmental notches are being monitored to evaluate their effectiveness in improving the riverine habitat behind the structures and their effectiveness in enhancing the flood carrying capacity of the river.

1.10.4. Engineering and design programs utilize data from the condition and operation studies to design and plan for implementation of new work and repair work necessary to maintain the structures and to retain the navigable channel. An objective of the continuing engineering and design program is to modify structure design and to adopt maintenance procedures that will preserve and possibly enhance environmental values of the river. Another objective of the program is to determine structure design that will avoid further increases of flood stages of the river. Additional design assistance is also provided through scale modeling of structure design and placement under simulated river conditions at the Mead Hydraulic Laboratory, Mead, Nebraska. The movable bed model facility is operated as a joint use project under a special lease arrangement between the University of Nebraska at Lincoln and the Corps of Engineers.

1.10.5. Dredging is used today to maintain adequate channel depths or widths at river locations where the natural erosive character of the river, in combination with the project structures, temporarily does not provide the desired navigation channel dimensions. In the 500 miles of river below St. Joseph, Missouri, 24 sites were dredged in 1974; dredging has not been necessary since 1976. Dredging has

not been required above Rulo, Nebraska since 1965. The need for dredging is expected to diminish as the completed project continues in operation under current water conditions; that is, 30,000 to 35,000 cubic feet per second discharge past Sioux City, Iowa. The avoidance of dredging continues to be a design objective. Navigation channel deposits which might require dredging cannot be predicted in advance; however, several kinds of areas are known to be more susceptible to sediment buildup than others. The susceptible areas include reaches downstream of tributary mouths, unusual channel alignments, and bridge crossings. Prior to 1974, dredging was accomplished by Government-owned equipment operated by Corps personnel. The 1974 dredging was contracted to a commercial firm. Future dredging is expected to be performed either by Government forces or by contract on an as-needed basis. Disposal of dredged material in the past years was in river areas between or behind project structures; areas that would eventually be filled in by the river itself in the normal process of accretion. As a result of consultation with EPA and Fish and Wildlife agencies, future dredge material disposal will be confined to open water areas away from the river bank and away from quiet, shallow water areas. Each Corps of Engineers District (Kansas City and Omaha) that administers a part of the project will comply with Sections 313 and 404, PL 92-500, as amended. Typically, a single public notice will be issued each year that dredging is anticipated to become necessary. The notice will cover all reaches of the river within the issuing District's administrative areas that are believed to require dredging. The public notice provides interested agencies and individuals 30 days to submit written comments on the proposed action; public hearings may also be requested.

1.10.6. Support programs involve updating and selling navigation charts and recording commercial river traffic.

1.11. Other Federal Projects and Activities. Other Federal projects, programs or activities which are affected by, or affect the Bank Stabilization and Navigation Project, are:

1.11.1. Missouri River Basin Comprehensive Plan. The 1944 Flood Control Act gave birth to the Nation's first attempt at solving its water resource problems through a comprehensive approach to river basin development. This legislation, known as the Pick-Sloan Plan, as amended and supplemented to date, provides multiple benefits -- flood control, irrigation, generation of hydroelectric power, improvement of navigation on the lower Missouri River, improved municipal and industrial water supplies, water quality control, conservation of fish and wildlife, and public recreation. The plan provided for building some 103 dams and reservoirs to provide storage capacity of approximately 110,000,000 acre-feet for multi-purpose use; local levees and floodwalls to protect municipal, industrial, and agricultural areas; and a system of levees on both sides of the Missouri River between Sioux City, Iowa, and the mouth to protect over a million acres of bottom lands from flooding. Uses of stored

water include the irrigation of some 4 million acres of land; the generation of 13 billion kilowatt hours of hydroelectric power annually; and regulation of river flows to provide for navigation. The authorizing legislation called for the construction of about 1,500 miles of levees along both banks of the Missouri River from Sioux City, Iowa, to the mouth. Of the 150 levee units originally contemplated in the entire system, 87 have been completed. The completed units have, through Fiscal Year 1976, prevented about \$1.9 billion in flood damages. These levees are designed to function in conjunction with the operation of the reservoirs on the Missouri River mainstem and the lower Missouri River Basin tributaries. Permanently secured river banks were necessary before the levees could be constructed. It is apparent that the Pick-Sloan Plan and the Missouri River Bank Stabilization and Navigation Project closely complement each other.

1.11.2. Regulatory Actions. The Corps has traditionally administered the permit actions required by the Rivers and Harbors Act of 1899. Section 9 of the Act addresses dams, dikes and bridges across or in navigable waters of the United States, although authority over bridges and causeways was transferred to the Department of Transportation under the Department of Transportation Act of 1966 and delegated to the Coast Guard. Section 10 prohibits construction of all other types of structures or work unless permitted by the Corps of Engineers. Section 13 addresses dumping refuse into navigable waters. Section 14 gives the Corps the responsibility for permitting temporary occupancy of structures in the navigation channel. Since the passage of the Federal Water Pollution Control Act Amendments of 1972, the Corps has the added responsibility to regulate the disposal of dredged or fill material in the waters of the United States (Section 404). Section 402 of the same Act superseded Section 13 of the 1899 Act and gave the permit responsibility for point source discharge to EPA. Section 10 and Section 404 permits are the major types of permits now issued by the Corps of Engineers for particular actions within the project reach of the Missouri River.

1.11.3. U. S. Coast Guard Activities. The U. S. Coast Guard is responsible for placing buoys to mark the navigational channel and for reporting channel conditions to the users of the river. They insure safe recreational and maritime use of the river, and have the responsibility and authority to issue citations for violations of Federal maritime statutes. The Coast Guard also is responsible for permitting bridges and causeways across navigable waters of the U. S.

1.11.4. Middle and Lower Missouri River Flood Plain Special Study. The study contains two phases: (1) an on-going Corps of Engineers' study which will serve as the technical information base, and (2) a Missouri River Basin Commission (MRBC) - Water Resources Council

(WRC) sponsored phase which will develop the necessary and desired flood plain management program. This study will focus on the flood plain issues in the 811-mile reach of the Missouri River main stem from Gavins Point, South Dakota, to the confluence of the Missouri and Mississippi Rivers at St. Louis, Missouri. In this study reach some 54 municipalities lie on or adjacent to the 1,971,600-acre Missouri River flood plain. The problem areas and issues this special study proposes to address relate to land use and development of the Missouri River flood plain. The demand for land on the flood plain for powerplant sites, industrial complexes, intensified agriculture, bridge crossings, residential and commercial areas, and other types of development is increasing; however, the regional and local effects of these demands in terms of impacts and their magnitude are unknown. If developments continue without coordination, they will eventually impair the flood protection provided by the reservoir and levee systems. Some states have no authority to manage the flood plain while other states have non-uniform or non-compatible authority; therefore, at present, any effort to provide wise use of significant reaches of the flood plain may be jeopardized by incompatible actions either further upstream or downstream.

1.11.4.1. The proposed special study will provide the five States of South Dakota, Nebraska, Iowa, Kansas and Missouri with a program which will focus on the regional framework necessary to effectively and efficiently manage the overall flood plain of the Missouri River below Gavins Point, South Dakota.

1.11.5. Inland Waterway System. The Missouri River from its mouth to Sioux City, Iowa, is a part of the 19,000-mile active, commercial inland waterway of the United States. The Tennessee, Lower Mississippi and Gulf Intracoastal waterways receive more than two-thirds of the commercial commodities shipped from the Missouri River. In terms of commodities shipped to Missouri River ports, the Lower Mississippi and Gulf Intracoastal waterways contribute almost one-half of the total.

SECTION II - ENVIRONMENTAL DESCRIPTION

2.01. Historical Setting. Man first discovered the Missouri River at least 12,000 years ago. The earliest Americans used the products of the river and its flood plain for food and shelter, and the river as a source of transportation and commerce — not unlike modern man, except that influence in prehistoric times probably extended no further than the Rocky Mountains and the Great Lakes; today, similar activities influence the quality of life of the entire Nation. For about 200 years from the time of the river's modern discovery by Europeans the Missouri River was the main artery of travel and commerce to the Northwest. Fur traders and trappers led the way using Indian-type canoes and flatbottomed boats. Larger boats first navigated the river in 1804 when Captains Meriwether Lewis and William Clark and their party explored the Northwest. In 1819 steamboat navigation was introduced. The first commercial barge line from St. Louis to Leavenworth, Kansas, was inaugurated in 1829. Attempts to improve the river for navigation began almost as soon as commercial traffic began moving on the river. Early work on the river consisted of removing snags. The first snag to be removed under an Act of Congress occurred in 1838.

2.01.1. Clues to many of these past events are prevalent along the Missouri River ranging from single artifacts, campsites, and steamboat wrecks to thriving cities built upon earliest European settlements. With the exception of steamboat wrecks and flotsam from river-devoured farms, towns, trading posts, and aboriginal sites, historical resources in the flood plain are restricted to terrace ("high bank") locations. Elimination of bank erosion by the project revetments and dikes has had a beneficial effect upon these sites. Thirty-eight of the known 96 historical sites in the river valley between Rulo, Nebraska, and the river mouth are located near the river but not adjacent to the channel. A great many more cultural resource sites probably exist. Captain Chittenden's 1897 compilation of steamboat wrecks on the Missouri River tallies 273 boats lost between 1819 and 1897. Many other boats were wrecked but recovered. Steamboat wreckings were so common, according to the Nebraska Historical Preservation Officer, that one could float the river between Sioux City, Iowa, and Rulo, Nebraska, today and pass the grave of a steamboat on the average of every five miles.

2.01.2. It is possible that some cultural resources have, unwittingly, been adversely affected by project construction; however, the chance of additional adverse effects by the remaining construction or annual maintenance is remote and not intended. The Nebraska Historical Preservation Officer has suggested that potential damage to archaeological and historical resources may come from stone quarrying.

All stone used for construction and maintenance of project structures is purchased from privately operated quarries usually located adjacent to the river.

2.01.3. The National Register of Historic Places has been consulted and no listed property will be affected by the remaining construction or by anticipated annual maintenance of the existing structures or dredging. Executive Order 11593 compliance is effected through ongoing and routine coordination with state historic preservation officers and the National Park Service. Pertinent correspondence with the state historic preservation officers and the National Park Service is appended as Exhibit 1. No response from the National Park Service was received.

2.02. Physical Setting.

2.02.1. Missouri River and Valley. The channel of the Missouri River confined by the project structures from Sioux City to the river mouth is now one channel consisting of smooth bends and relatively stable banks of a width varying from 600 to 1,100 feet. There is no appreciable bank erosion. Remnant oxbow lakes (Brown's Lake, Iowa; Big Lake, Mud Lake, and Brown's Lake, Missouri; Lake Manawa and Carter Lake, Iowa) and channel scars can still be found on the surface of the flood plain indicating that the river channel, earlier in its existence when free to erode its banks, had occupied nearly every foot of the valley between the bluff lines. Man-made oxbows and channel cutoffs are also found in the flood plain, particularly above Omaha. The major development effort of the project in this reach which occurred in the late 1950's and early 1960's created several side channel oxbow lakes notably Snyder, Winnebago, Tieville, Glover's Point, Omadi Bend, Blackbird, Decatur, and Louisville oxbow lakes. DeSoto Bend Lake, now administered by the U. S. Fish and Wildlife Service as a waterfowl refuge and recreation area, was created by a channel cutoff in 1962.

2.02.1.1. The flow of the Missouri River at Sioux City, Iowa, is essentially controlled by the six Missouri River main stem lake projects. This system normally releases from 15,000 to 20,000 cubic feet of water per second (cfs) in the winter, non-navigation season. During the eight-month navigation season, the system normally maintains a discharge in the range 30,000 to 35,000 cfs at Sioux City. Higher releases are maintained in years when it is necessary to evacuate greater-than-normal inflows to the reservoir system. Sustained discharges up to 55,000 cfs are maintained at Sioux City about one year in ten and up to 80,000 cfs about one year in a hundred. Between Sioux City and the mouth, the normal pick-up of discharge from the tributaries during the navigation season, and when the tributaries are not in flood, is 15,000 to 20,000 cfs.

2.02.1.2. Major floods over the entire length of the Missouri River are rare because of the size of the basin and the presence of the

main stem dams and tributary stream dams. Reservoir regulation of flooding is most effective at Sioux City which is just downstream from the Missouri River reservoir system. The degree of control is reduced downstream as tributary runoff, principally from the Platte, Kansas, Grand, Chariton, Osage, and Gasconade river basins, enters the Missouri River. Most floods which occur above the Kansas Citys are the result of snowmelt combined with rainfall. Below Kansas City the floods are more often the result of heavy rainfall. The great floods of record below Kansas City, Missouri occurred in 1903 and 1951. Above Kansas City the snowmelt floods of 1881 and 1952 were the largest of record. Discharge probability relationship describing the probability of various flood peak discharges at cities adjoining the river are found in Flow Probability Curves presented in Exhibit No. 4. The upper sets of curves in Exhibit 4, labeled "Conditions I, II, and III", are for the previous unregulated discharge on the Missouri River before construction of the main stem and tributary reservoir systems. The lower sets of curves, labeled "Conditions IV, V, and VI", are representative of today's discharges with essentially all the reservoirs in operation. It can be seen in Exhibit 4 that the flood peak discharges have been reduced most substantially at Sioux City and Omaha, which are just deviations from the main stem reservoir system, while at Brownville and Hermann, which are several hundred miles downstream near the mouth of the Missouri River, the effect of reservoir regulation is not so strongly felt. Reaches of the lower river may at times be called upon to carry discharges in excess of 600,000 cfs.

2.02.1.3. Average Missouri River velocity ranges from 3 to 6 feet per second (fps). During the navigation season, mid-channel velocities of 4 fps to nearly 7 fps are encountered. The overall gradient of the Missouri River is roughly 1.0 foot per mile. There is a continuing trend of lowering river surface in the river reach between Sioux City, Iowa, and Blair, Nebraska. The riverbed throughout the project reach experienced a general lowering during the 1960s and early 1970s. The trend has apparently stabilized, except for the Sioux City to Blair reach.

2.02.1.4. Suspended sediment concentrations range from 200 to 1,500 ppm (parts per million) for normal navigation season discharges, although they commonly range up to 5,000 ppm in times of flood. Concentrations as high as 40,000 ppm at Omaha and 20,000 ppm near the mouth have been recorded for a day or so during rainfall floods that originate from the Iowa and Missouri tributaries. The riverbed material is a fine sand with a median size ranging from 0.25 to 0.40 millimeters. Virtually all the bed material is coarser than 0.10 millimeters, and material coarser than about 2.0 millimeters is little in evidence. The bed material is transported downstream by being entrained by the flow and through the slow advancement of dunes on the riverbed. Turbidity is low during normal navigation flows when the river discharge is supplied from the

upstream dams and the major source of suspended sediment is sand from the riverbed. Turbidity increases as high concentrations of silts and clays enter the Missouri River. The average annual sediment outflow from the Missouri River at St. Louis is about 60 million tons. Most of this sediment consists of silts and clays which are derived outside the Missouri River channel.

2.02.1.5. The Environmental Protection Agency's "National Water Quality Inventory" report of 1974 to Congress rated the river water quality as poor. The basis for the poor rating is the amount of sediment the river transports. In other respects the quality of the river water is much better. A number of cities along the river use the river as their potable water source. Of course, a number also use the river to carry away their sewage. Steam generating electrical plants -- their numbers are growing -- are using river water for "once-through" cooling, adding heat to the river water. To date, the cumulative effect of the added heat to the Missouri River water by plants in operation has not had a significant adverse effect on the overall water quality of the Missouri River.

2.02.1.6. The Missouri River valley width from the river mouth upstream to immediately downstream of Kansas City, Missouri averages three miles. It abruptly widens to about ten miles just below Kansas City, then rapidly constricts to two miles at Kansas City. From Kansas City, Missouri the valley gradually widens to about 15 miles at Sioux City, Iowa.

2.02.2. Geology. The Missouri River is a mature river which, prior to development of the main stem dams and the bank stabilization structures, meandered through its flood plain transporting glacial debris originating in the north and east part of the basin and fine sedimentary soil originating in the west and south part of the basin. Glaciologists agree that the strong westerly winds which occurred during the period immediately following the retreat of the Iowan ice sheet were instrumental in moving fine glacial and non-glacial material. This fine material (loess) covers eastern Nebraska and Kansas, southern and central Iowa, and northern Missouri. Loess is highly erodible and is, today, the major contributor to the river's sediment load.

2.02.3. The soils of the eastern third of the Missouri River Basin developed under humid climatic conditions. Approximately 50 percent formed under prairie vegetation and are called Udolls. The other 50 percent developed under timber vegetation and are called Udalfs. Soils of the remaining two-thirds developed under prairie vegetation. The Ustolls occur in the warmer southern part of the basin and the Barolls occur in the colder northern part.

2.02.4. Climate. The climate of the project area is in large measure the result of its latitudinal location (between 39 and 43 degrees North Latitude) and its domination by the Polar Canadian (cold, dry air) and Tropical Continental (hot, dry air) air masses. The basin

has 2,800 mean annual hours of sunshine, and mean daily solar radiation of 375 gram calories per square centimeter. The mean maximum temperature throughout the project area is about 90 degrees F. occurring in July; the mean minimum temperature occurs in January and varies from 37 degrees F. at the river mouth to 20 degrees F. at Sioux City, Iowa. The mean annual snowfall is 32 inches at Sioux City, Iowa, and 12 inches at the river mouth. The mean annual precipitation varies from 40 inches at the river mouth to 25 inches at Sioux City, Iowa, with the basin receiving a measurable amount of precipitation 105 days out of the year. There are, on the average, 180 freeze-free days in the lower reach of the project and 150 freeze-free days in the upper reach of the project each year. Summer winds average 6 miles per hour from the south and blow from the northwest at the same speed during the winter. The major towns and cities along the river within the project area have low air pollution emissions of sulfur dioxide, nitrogen dioxide and particulates. On the average, there are about 50 thunderstorms annually in the lower two-thirds reach of the project and 45 in the upper third of the project. The Missouri River lies on the northeast edge of the Nation's most severe tornado area of Oklahoma, Kansas, eastern Nebraska and west-central Missouri.

2.03. Biological Setting.

2.03.1. Floodplain Vegetation. Studies conducted by the University of South Dakota (1973) and the University of Missouri (1974) show that the majority of the flood plain in the project area is devoted to crop production. Timbered and wooded areas within the project area are limited to non-contiguous, narrow strips adjacent to the Missouri River and its tributaries (those not channelized and diked).

2.03.1.1. Trees common to the remaining wooded areas are box elder, maple, green ash, honey locust, walnut, cedar, mulberry, sycamore, cottonwood, willow and elm. Shrubs in the understory include bitter-sweet, poison ivy, dogwood, sumac, honeysuckle, rose, raspberry, gooseberry, wolfberry, and wild grape. Common herbaceous plants include ragweed, milkweed, hemp, aster, nettle, fern, sunflower, beggar ticks, smartweed, bindweed, wild strawberry, clover, catnip, sourdock, and violet. Common grasses are brome, bluegrass, canary grass, wild rye, and fescue.

2.03.1.2. There are no endangered or threatened plant species known to occur in the project area that are listed in the "Report on Endangered and Threatened Plant Species of the United States" compiled by the Secretary of the Smithsonian Institution, 1975.

2.03.2. Mammals. Wild mammal populations in the project reach depend upon the habitat in the bottomlands and bordering uplands for their maintenance and survival, and to a large extent the population sizes. The majority of the forested, marsh, backwater meadow, sand bar and dune areas are located on or near the banks of the Missouri

River. Whitetailed deer, raccoon, fox, opossum, cottontail rabbit, squirrel, skunk, coyote and small rodents are the most common terrestrial mammals in the project reaches. The deer, beaver, muskrat, weasel, mink, raccoon, fox, opossum, rabbit, squirrel, skunk and coyote are typical of the riverine woodland environment; however, the mink and raccoon also utilize marsh and stream habitats. Other small mammals in the project area are shrew, 13-lined ground squirrel, plains pocket gopher, mice and voles. Abandoned buildings, bluff caves and the more dense riverine woodlands in the project area provide habitat for bats.

2.03.2.1. As clearing of the Missouri River floodplain continues, the heavily wooded habitat needed for the red bat, evening bat, and silver haired bat will continue to decline. Floodplain timber clearing also causes population declines in both red and gray squirrels, whitetail deer, weasel and the nocturnal flying squirrel. The number of mink is also declining; their one basic requirement for habitat is permanent water, preferably with adjacent standing timber.

2.03.2.2. Some species such as the raccoon, coyote, opossum, and skunk have adapted to changed conditions probably because their habitat needs are quite general and more flexible than many other mammals.

2.03.3. Birds. The Missouri River valley in the project area is on the border between the Mississippi Flyway and the Central Flyway. Common waterfowl that migrate through the project area include Canada, blue, snow, and white-fronted geese; mallard, teal, shoveler, gadwall, scaup, merganser, bufflehead, American widgeon, canvasback, ruddy duck, goldeneye, red head, pintail, and wood ducks. Species of waterbirds include the grebe, gull, tern, pelican, cormorant, and coot.

2.03.3.1. Wading birds which may be present are heron, egrets, bitterns, and cranes. Shorebirds include the plovers, sandpipers, avocets, and phalaropes. Common raptorial species which could possibly be observed are the hawks, (redtailed, Harlan's, sharp-shinned, marsh, Swainson's, rough-legged), falcon (sparrow hawk), owls (barn, great horned, shorteared, and screech), and the scavenger species the turkey vulture. Numerous smaller song birds also live in the project area.

2.03.3.2. The American peregrine falcon and the bald eagle are the only endangered species within the project area. Because the peregrine falcon is a transmigrant, the project does not offer critical habitat for this species; therefore, project maintenance and remaining construction will not impact on the peregrine falcon. Few golden eagles, but numerous bald eagles, winter along the Missouri River in the project area. The bald eagle, the only North American representative of the fish or sea eagles, is particularly attracted to the river. This bird is, however, a "discriminating" omnivorous feeder utilizing weakened birds (mostly

waterfowl) and small mammals when these food sources are more available than fish. The Osprey does not breed or winter in the area of the project, but may be seen migrating during the spring and fall.

2.03.4. Reptiles and Amphibians. Studies conducted by the Universities of South Dakota (1972) and Missouri (1973) concluded that channelization and stabilization have very likely reduced populations of marsh inhabiting forms of amphibians and reptiles, and the farming that follows land formation caused by stabilization has further detrimental effects on populations of terrestrial forms of amphibians and reptiles.

2.03.4.1. Species of amphibians and reptiles common in the project area include cricket frog, common American toad, great plains toad, Rocky Mountain toad, gray treefrog, great plains narrow-mouthed toad, chorus frog, bullfrog, leopard frog, plains spadefoot toad, snapping turtle, western painted turtle, Blanding's turtle, map turtle, false map turtle, Mississippi map turtle, red-eared turtle, western box turtle, pond slider, smooth soft-shelled turtle, spiny soft-shelled turtle, northern red-bellied water snake, Graham's water snake, diamond-back water snake, and northern water snake.

2.03.5. Endangered Animal Species. There are no species of animals (mammals, birds except the American peregrine falcon, reptiles, amphibians, and fish) that live within the project area that are listed in the U. S. Department of Interior, October 1976 "Endangered and Threatened Wildlife and Plants" list.

2.03.6. Aquatic Life. The Missouri River below Sioux City, Iowa, is a highly controlled, channelized stream being confined to a sinuous, artificial channel. The main channel is the area of greatest current (averaging 3 to 6 fps), with a variable depth of 4 to 30 feet and a substrate of fine, shifting sand. Ecologically, this is the most impoverished zone of the river, with few food resources other than microinvertebrate drift, composed mostly of insects and detritus. The outer banks of the channel have been stabilized by revetments, while the inner banks are protected by dikes which effectively direct the main current toward the middle of the channel, causing scour holes at the riverward ends of the dikes. Behind some dikes are areas of relatively shallow and quiet water which may have relatively high sedimentation rates at some flows but tend to scour out at others. The slack waters behind the dikes are resting and feeding areas for fish. Emergent vegetation is usually lacking, and algae is usually found only in a narrow band on the dike structure itself. The substrate is composed of deep mud or silt. During low-flow periods in winter, these backwaters are either left dry or reduced to isolated pools. In the former case, the fish that normally inhabit these backwaters find other less suitable shelter areas in the main stream such as scour holes at the dike tips. The immediate water area and associated interfaces

around dikes offer as diverse aquatic habitat as any of the major divisions of the river ecosystem (main channel, dikes, chutes and sloughs adjoining the main channel, and tributary confluences). This is not to say, however, that the habitat of the rock substrate could replace other major habitat types. The rock substrate does offer several ecological advantages. The uneven rock/water interface causes small and frequent eddies to occur which allows small fish and other nektonic organisms to move within this habitat type with comparative ease. Rock is adequate substrate for aufwuch community development. The stable mud/silt bottom associated with the dikes offer fairly stable bottom for benthic colonization. And, the "quiet" water around the dike permits the expression of planktonic communities. Nekton, particularly fish, utilize these biological communities as sources of food and share their habitat as escape, reproduction, resting and nursery cover. Chutes and sloughs, although typically not as diverse in habitat as dike areas, appear to be the most productive of river habitats. Studies associated with Omaha Public Power District Nebraska City Unit No. 1 and the Fort Calhoun nuclear power plant showed this biological relationship. Generally, the studies reveal that the standing crop of benthos in the open channel averages about 30 grams per acre, about 300 grams per acre in the dike areas, and about 3,000 grams per acre in the chutes and sloughs.

2.03.6.1. The surface area of not only the river channel but the adjoining, biologically valuable shallow waters is diminished by the low flows during the winter (non-navigation) period, by the placement of dredged material behind dikes (which will no longer be the usual disposal site), and by the degrading river bed in the reach between Sioux City, Iowa, and Blair, Nebraska. Maintenance dredging operations have used the space behind some dikes for the placement of dredge spoil. This operation effectively diminishes or at times eliminates the area's contribution to the aquatic ecosystem. The water's action of degrading the river bed causes draining of a number of shallow water areas associated with the dike structures or creates isolated shallow water areas around the dikes. Low flow during the winter and degradation of the river bed in the upper reach of the project area also drains, isolates or significantly lowers water levels of the chutes and sloughs which adjoin the river, significantly diminishing their overall value, ecologically, to the river's aquatic ecosystem. Seasonal maximum high flows can overtop a number of dikes and impound sediment-laden water in areas behind dikes, and in chutes and sloughs. Deposition of sediment in these areas further depletes the ecological quality of these aquatic habitats. Today, a number of chutes and sloughs are isolated from the main channel by the recurrence of these actions, and many dike structures are now surrounded by terrestrial rather than aquatic habitat as a result of numerous repetitions of these actions.

2.03.6.2. The community of fishes in the Missouri River Basin is not unlike the fish community in the Mississippi River Basin; their

numbers, however, are much less. Within the project reach of the Missouri River the following fish species can be found. Goldeye, carp, river carpsucker, and channel catfish are commonly found in the main channel. Shortnose gar, gizzard shad, goldeye, carp, river carpsucker, silver chub, silvery minnow, emerald shiner and plains minnow are common around dike structures. At tributary confluences, it is usual to find shortnose gar, gizzard shad, goldeye, carp, river carpsucker, emerald shiner, plains minnow, channel catfish and sauger. Less common fish in the Missouri River include shovelnose sturgeon, flathead catfish, paddlefish, bigmouth buffalo, freshwater drum, walleye, sand shiner, red shiner, northern pike, white bass, crappie, and blue sucker. There are a number of other fish species which are known to exist in the river. These include the chestnut lamprey, silver lamprey, lake sturgeon, American eel, goldfish, bowfin, speckled chub, sturgeon chub, flathead chub, sicklefin chub, highfin carpsucker, white sucker, black buffalo, green sunfish, and pumpkin seed.

2.04. Social and Economic Setting.

2.04.1. Population. About three and a half million people resided in the 45 counties adjacent to the Missouri River in Nebraska, Iowa, Kansas and Missouri in 1970, or about 30 percent of the total four-states' population of 11,232,511. More than two-thirds of the population live in cities and towns. Standard Metropolitan Statistical Areas (SMSA) comprise counties which include and adjoin Sioux City, Iowa; Omaha-Council Bluffs; St. Joseph, Missouri; the Kansas Cities; Columbia, Missouri; and St. Louis, Missouri.

2.04.1.1. The four states adjacent to the river have shown moderate rates of population increase between 1960 and 1970 (Iowa 2.4%, Nebraska 5.1%, Missouri 8.3%, Kansas 3.1%) as compared to the 13 percent increase in the United States. The population of the 45-county area, however, increased 16.5%, with most of the increase occurring in the SMSA's. Counties with highest increases were: Sarpy County, Nebraska (103.6%); St. Charles County, Missouri (75.5%); Boone County, Missouri (46.6%); Clay County, Missouri (41%); and Platte County, Missouri (37.4%). Each of these counties is in or near one of the SMSA's. Counties showing greatest population decreases include: Holt County, Missouri (-15.6%); Monona County, Iowa (-13.3%); Mills County, Iowa (-10.0%); and Chariton County, Missouri (-12.9%). These rural counties are either located in western Iowa, central Missouri or northeast Nebraska.

2.04.2. Employment. The total number of persons employed in the 45-county area adjacent to the river in 1970 was 1,348,615. Employment opportunities were greatest and appear to continue to be

in metropolitan areas. The 45-county area ranks higher than the national average in terms of employment in the transportation industry. Distribution of employment between counties in the four states is similar, except in Iowa which has a greater proportion of persons employed in the agricultural industry than the other states.

2.04.2.1. An analysis of employment distribution by industrial and occupational groupings shows that an average of 23.2 percent of the 45-county area workforce was involved in manufacturing activities in 1970, while about 38.6 percent of those employed worked in white-collar jobs. Gasconade County, Missouri, had the highest percentage (39.2) of people employed in manufacturing trades, followed by Franklin County (35.7) and St. Charles County, Missouri, (34.7). St. Louis County, Missouri, had the highest percentage (62) of people employed in white-collar jobs, followed by Cole County, Missouri (Jefferson City 58.5) and Douglas County, Nebraska (54.9).

2.04.2.2. The per capita income of individuals in the area in 1970 was \$2,877. The mean family income for the 45-county area was \$9,340. This compares to \$10,999 for the Nation. In 1970, about 10.8 percent or 60,902 families in the 45-county area were living below the poverty level, as defined by the Bureau of Census, compared with 10.7 percent for the entire United States. There was considerable variation among the counties.

2.04.3. Racial Characteristics. About 4.9 percent of the population of the 45-county area adjacent to the Missouri River is of minority races. The counties with highest percentages of non-white population include: Thurston County, Nebraska (27.6% American Indian); Wyandotte County, Kansas (19.8%); and Jackson County, Missouri (17.9%). Most rural counties in the four states have low percentages of non-white residents.

2.04.4. Land Use. The most recent Census of Agriculture, and the Soil Conservation Service State Conservation Needs Inventories of 1969 and 1970 indicate that agriculture is the predominant land use in the 45-county area adjacent to the river. The fertile soils and favorable rainfall of the region have contributed to agriculture. Iowa counties have the greatest percentage (85.2%) of agricultural land (pasture, range, cropland), followed by counties in Nebraska (81.9%). Overall, about 56.9 percent of the 45-county area is in cropland use. Pasture use (13.3%) is the next largest land use in the area. Federal lands, primarily fish and wildlife refuges and military installations, make up only 0.4 percent of the total land of the area.

2.04.4.1. The average size of the 52,554 farms in the 45-county area in 1970 was 50-180 acres. The total value of agricultural products (crops and livestock) produced on these farms was \$1.03

billion in 1969. This was an average of \$9,710 per farm. Farm incomes in Nebraska counties average \$36,495, while farm income in Missouri averaged \$12,330. The sale of livestock composed about 74 percent of all farm product sales in the 45-county area.

2.04.5. Transportation. The four-state area and counties near the Missouri River are well served by highway, airline, railroad, pipeline, and river navigation systems. Cities like Sioux City, Omaha, St. Joseph, Kansas City, and St. Louis have historically been central transportation hubs of the middle west.

2.04.5.1. The Interstate Highway System is a major component in the adequate net of highways found in the area. Interstate 29 which parallels the river from Sioux City, Iowa to Kansas City, Missouri is a major north-south route. Interstate 35, another north-south route crosses the Missouri River at Kansas City, Missouri. Interstate 80, a major east-west transcontinental route, crosses the Missouri River at Omaha, Nebraska. Interstate 70, another major east-west route parallels the river from Kansas City to St. Charles, Missouri.

2.04.5.2. The cities of Omaha, St. Joseph, Kansas City, and St. Louis have also historically been known as railroad centers. Twelve major rail lines including the Rock Island Lines; Missouri Pacific; Missouri, Kansas-Texas; Gulf, Mobile and Ohio; Burlington Northern; Norfolk and Western; Atchison, Topeka and Santa Fe; Union Pacific; Chicago and Great Western, Chicago, Milwaukee, St. Paul and Pacific; Chicago and North Western; and Illinois Central Gulf serve the 45-county Missouri River area.

2.04.5.3. Commercial passenger and air freight service is available in Sioux City, Iowa; Omaha, Nebraska; St. Joseph, Missouri; Kansas City, Missouri and Kansas, Columbia-Jefferson City, Missouri and St. Louis, Missouri. These airports, with the exception of Columbia-Jefferson City, Kansas City International and St. Louis, Missouri, are located on the Missouri River floodplain.

2.04.5.4. The pipeline is one of the most economical and dependable forms of transportation of certain commodities in the Missouri River basin. Principal commodities transported by pipelines are crude petroleum, petroleum products, natural gas and anhydrous ammonia.

2.04.5.5. The Corps of Engineers has granted permits for over 50 pipeline crossings of the Missouri River in the project area.

2.04.5.6. The project provides for a navigable waterway 735 miles long from the mouth to Sioux City. This is about 8 percent of the total miles of navigable waterways in the Mississippi basin, and about 2.8 percent of the 25,000 total miles of navigable inland waterways of the Nation. Commercial traffic on the Nation's

inland waterway system totaled about 204 billion ton miles in 1970. In 1977 approximately 3.3 million tons, exclusive of sand and gravel and waterway improvement materials, were moved on the Missouri River although it is expected to increase to about five million tons per year over the years with the completion of the navigation project and the development of port facilities and shipping patterns. The Missouri River is principally oriented to serving agricultural and related food processing sectors of the river basin economy. In terms of inbound traffic, salt, molasses and fertilizers account for 80 percent; for outbound traffic, cash grains alone account for 80 percent. Hazardous materials moved on the river include caustic soda, gasoline and anhydrous ammonia. To date, no accidents involving barges carrying these materials have occurred. Roughly, two-thirds of the commercial river traffic accrues outside of the Missouri on segments of the overall Mississippi-Gulf system. Of the 3.1 million tons of commercial traffic moving on the Missouri River in 1976, about 67 percent originated or terminated in the Sioux City to Kansas City reach. For every 10 tons that moved upstream about six tons moved downstream in this reach. The average length of haul on the Missouri for commercial traffic is about 480 miles. The character of the Missouri River waterway determines the size of tows and towboats. The average towboat size is 2400 horsepower with tows of one to eight barges. The towboats are generally kept underway continually, picking up and dropping off barges at fleeting areas (195 commercial terminals).

2.04.5.7. The Missouri River channel bed is a prime and least-cost source of indigenous sand and gravel deposits in the river basin. Sand and gravel tonnage on the river represents the single largest commodity, averaging about 2,800,000 tons annually. Because the average movement is but 1.5 miles, gravel represents only one percent of the ton-miles within the Missouri River system. Like sand and gravel, waterway improvement materials moving on the waterway have ranged from 2.4 billion tons in 1970 to 0.6 billion tons in 1976.

2.04.6. Recreational Use. Boating, fishing and waterfowl hunting are recreational activities commonly undertaken on the river. Camping, picnicking, sightseeing, hiking, fishing, and hunting are activities typically accommodated on the banks of the river and lands adjoining the river. Without a doubt, much more recreational use occurs on lands not formally devoted and developed for recreation than occurs on recreation developed lands. The lack of ready access on the private lands adjoining the river and the river bank is a very significant barrier to considerably more public use than is occurring today.

2.04.6.1. The use of the river for recreation (boating, water skiing, boat fishing) during the summer is restricted by the high river stages which covers up potential safety hazards like ends of dikes and

carries potentially hazardous floating debris. River velocities of 3 to 6 fps are also a deterrent to recreation boating. The present frequency of commercial river traffic does not adversely affect recreational boating; in fact, the occasional passage of towboat and tow adds a pleasing "backdrop" to the river scene. However, tow wakes may be hazardous. Lower river stages in the fall caused by release cutbacks from upstream dams typically leaves waterfowl decoy setups in shallow chutes and sloughs "high and dry" in the river reach from Sioux City to the Platte River, which detracts from the quality of waterfowl hunting in that reach. On the other hand, the reduced stages in the lower river exposes sandbars used by hunters.

2.04.6.2. Summer recreation fishing occurs mostly around river dikes, in the deep eddies at the tip of the dikes and adjacent shallow waters downstream of the dike bordering the main channel, and tributary mouths. Fishing in the chutes is diminishing, except for DeSoto Bend where water depth management is practiced by the administering agency (FWS) as a part of its migratory waterfowl refuge management.

2.04.6.3. There are 21 developed river access areas provided by the Corps of Engineers in cooperation with non-Federal public interests. These areas typically provide for boat access to the river and picnic facilities; many also offer camping facilities. The Corps has investigated the public need for recreational development and currently recognizes the need for 76 additional access areas. The recreation plan (one plan covers the river from Sioux City, Iowa to Rulo, Nebraska, and another plan covers the reach from the river mouth to Rulo, Nebraska) is currently being updated. Two large marinas exist in Sioux City, Iowa, from which boaters ply river reaches in the upper project area and above the project. A number of marinas adjoin the river between Sioux City and the river mouth which berth pleasure boats that travel regularly on the project reach of the river.

2.04.6.4. A couple of sponsored recreational events have taken place on the river since 1971. The Great Missouri River Raft Race is a privately sponsored event occurring in early fall. This event is a race of two-man rafts from Blair, Nebraska to Omaha, Nebraska. It usually attracts 5,000 people some of whom travel thousands of miles to participate. Winners in several categories receive prizes. An annual canoe race is sponsored by Bellevue, Nebraska Chamber of Commerce and extends from Omaha to Bellevue. This event has attracted as many as 60 participants and has considerable local public appeal.

2.04.6.5. Flood and severe storm warnings are issued by Weather Service Forecast Offices throughout the reach of the Missouri River from Sioux City to the mouth via NAWAS, law enforcement network, news media and NOAA Weather Wire Service. This information serves the river recreationist and commercial towboat operator as it does the residents of the project area. Hazards may arise from large

and rapid inflow from heavy rains over the Missouri and the tributary drainage areas. Large Missouri main stem flood control reservoirs regulate flows in the river. Necessary increased releases to evacuate water stored during floods could threaten members of the public fishing in the normal river channel. The rate of river stage increase from this source, however, is quite slow. Rises in river stages can, however, flood parks, camping areas and other public use developments as it does provide major threats to towns and cities located along the river. In recognition of this problem, the National Weather Service has established a flood forecasting and warning service for the Missouri River throughout the project area. Radar indications of heavy rain supported by telemetry and observer reports of rainfall amounts and river stages provide support for this service.

2.04.7. Commercial Fishing. Fishing as an economic pursuit on the Missouri River has decreased in regional importance since 1908. Total commercial catches between 1894 and 1908 were reported to be in excess of 1,000,000 pounds per year, with 90% of the catch made up of catfish and buffalofish. Between 1908 and 1930 the total commercial catch dropped to around 500,000 pounds per year where it has remained. The catch since 1930 has been made up principally of carp (50-80%), buffalofish (7-17%) and catfish (12-20%). Since the beginning of record keeping in 1894, Missouri has lead in commercial fish production where, on the average, 38% of the annual catch occurs, followed by Nebraska (29%), Iowa (19%) and Kansas (14%). In 1973, Missouri reported a commercial catch of 335,000 pounds and Nebraska 108,000 pounds, both comparable with their historic annual catches. The value of the 1973 Missouri catch was estimated at about \$52,000 (only 8% of the catch was catfish, the more valuable species) while Nebraska's 1973 catch was valued at \$62,400 (presumably composed of a larger percentage of catfish).

2.05. Future Setting with the Project Operating with the Water Supply Reduced by Upstream Depletions. Although 24 years of multiple purpose operation of the Missouri River Main Stem Reservoir System have been experienced since Fort Randall was closed in 1952 and placed in operation in coordination with Fort Peck, operations before 1967 were atypical due to construction limitations on storage and releases, staged closure of the four other dams on the main stem, and the need to fill the large storage reservoirs created behind each dam. Thus, it was 1967 before the reservoir system was first filled and in normal operation. Since 1967, runoff above the reservoir system has been above normal in 8 of the 10 years and near normal in the other two years. Therefore, the 24-year period of actual operation of the main stem reservoir system does not adequately portray what might be considered to be the normal operation of this system in the future. Such operations can be more realistically demonstrated by consideration of hypothetical reservoir regulation studies under current and expected future water use conditions, with the reservoir system assumed to be in operation for the entire period of available hydrologic record, beginning in 1898.

2.05.1. Many such long-term reservoir regulation studies have been conducted during the past 30-40 years to determine how the system, and each reservoir in the system, could be regulated on a month-by-month basis to best serve the multiple purposes for which they were authorized. One recent reservoir regulation study, which was conducted and published as Series 1-74 in connection with an investigation of industrial water marketing from the main stem reservoirs, involved consideration of the month-by-month operation of the main stem reservoir system for the 1898-1972 period under 14 different assumptions as to present and potential upstream use of water for all purposes. Streamflow depletions in these studies for the area above Sioux City ranged from about 3 million acre-feet to about 13 million acre-feet above the 1949 level of water use.

2.05.1.1. These studies demonstrated that as beneficial consumptive uses of water increase in the Missouri Basin, the services which can be provided for other purposes will gradually reduce. The rate at which this reduction in service will take place is quite speculative, since it is based on estimates of future upstream water use which are uncertain at best. The referenced study considered three different levels of water use for industrial purposes (primarily coal development) by the year 2020, 700,000 acre-feet, 1,400,000 acre-feet and 3,000,000 acre-feet. More comprehensive studies of potential coal development which were conducted subsequently in connection with the Northern Great Plains Resources Program study indicate that streamflow depletions due to coal development will probably be less than 700,000 acre-feet.

2.05.1.2. The effect of streamflow depletions for all purposes (including 700,000 acre-feet for coal development) on service to navigation is summarized in the following table:

<u>Navigation Season Length in Months</u>	<u>No. of Years with Navigation Season Lengths Shown for Indicated Level of Water Resource Development</u>			
	<u>1970</u>	<u>1980</u>	<u>2000</u>	<u>2020</u>
8	66	62	52	51
7-8	1)	4)	4	0
6-7	4)*	0)*	7	6
5-6	4)	5)	3)	6
4-5	0	4)	7)*	9)*
Zero	0	0	2)	3)
Total No. of Years	75	75	75	75
Total depletions in Million Acre-Feet Above 1949 Level	2.8	3.9	5.9	6.9

* During assumed recurrence 'drought of 1930's.

An analysis of the total months of service which can be provided to navigation, compared to full, eight-month seasons in each of the 75 years, indicates that navigation would be served in 95% of the months under 1980 water-use conditions, reducing to 86% in 2020. The average streamflow targets for navigation, as determined for the Missouri River at Sioux City, would gradually reduce from the present level of 30,000 cfs to 29,000 cubic feet per second under 1980 conditions and to 27,000 cfs in the year 2020. Under these projected depleted conditions, navigation would remain viable on the Missouri River beyond the year 2020.

2.05.1.3. Long-term reservoir regulation studies have also been made to determine the maximum level of streamflow depletions above Sioux City that can be met, while still maintaining sufficient releases from the main stem reservoirs to meet downstream water supply and water quality control requirements. These studies indicate that the maximum depletions that could be tolerated would be about 13 million acre-feet annually. This is greatly in excess of the 6.9 million acre-feet listed in the above table for 2020 water use conditions and represents a distant future potential that does not bear on projections through the next half century.

2.06. Future Setting Without the Project. There is a wide range of possible scenarios for the future environmental setting of the project reach of the Missouri River should the Federal Government cease maintenance of the project structures and not complete the remaining construction. Individuals, industry, local or state governments separately or in combination could replace the Corps in maintaining the river at its present condition. Or, at the other extreme, there could be no maintenance at all, except for certain critical spots. Probably some effort between these two extremes would actually occur. Following is a possible environmental setting of the river area should the no-action extreme prevail. The water current, ice, freeze-thaw action, flood overflows and sedimentation continually act destructively on the present channel structures. Without maintenance of existing structures and the completion of remaining structures, the present channel configuration would gradually deteriorate. The present river alignment would probably be breached where navigation and bank erosion structures had been weakened by one or more of the destructive actions identified above. In the course of time these actions would occur at numerous points along the river reach. Navigation, as practiced today, would diminish due at first to development of one or a few shallow reaches in the river, later to be terminated because of numerous and extensive shallow river reaches. The intensive land practices which exist adjacent to points that would become active bank erosion sites would be abandoned. Active bank erosion would occur at such locations. As bank erosion becomes at least temporarily arrested, annual at first, followed by perennial, riverine plant communities would develop. Without bank stabilization in the present agricultural areas, existing levees would eventually have to be relocated landward or abandoned, reducing the acreage under agricultural production. In high valued

or critical areas near cities or at power plants and bridges, either the Federal Government or local governmental entities or private individuals would probably continue to expend funds to maintain the present bankline and levee alignment. These actions could be thwarted by the independent actions of others upstream in efforts to maintain their particular critical areas. If left to deteriorate, the river channel would probably increase in the diversity of aquatic habitat. It is believed that the economic values of the adjoining lands and the navigational attributes would diminish while the fish and wildlife values of the river (particularly) and adjoining lands would increase.

2.06.1. Long-term reservoir regulation studies have been conducted during the past 30-40 years to determine how the system, and each reservoir in the system, could be regulated on a month-by-month basis to best serve the multiple purposes for which they were authorized. One recent study involved consideration of the changes that could be made in system releases and in services to other functions if service to navigation were foregone. In most years changes would be minor. When storage reserves are essentially filled, and the annual water supply is normal or greater than normal, regulation of the reservoir system would not differ significantly whether navigation is being served or not. Under such water supply and storage conditions the necessity for storing flood inflows and evacuation of the resulting accumulated storage prior to the succeeding flood season, together with the constraints on winter releases imposed by river ice conditions, would result in quite similar storage and release patterns, irrespective of service to navigation.

2.06.2. The greatest effect upon system releases due to eliminating navigation as a project purpose would occur during years of less than normal water supply. Under these conditions, the reduction of winter releases from the system to conserve the water supply for navigation would no longer be necessary and higher winter releases would be balanced by lower releases during the summer. Essentially, a more constant system release rate through the year would be scheduled, with the minimum winter release level from the system raised from about 6,000 cfs to about 15,000 cfs. Under current conditions of water use, system releases of less than 15,000 cfs would result about 12% of the time with navigation being served, compared to 0% without navigation as a project purpose.

2.06.3. The effects of foregoing service to navigation would be minimal on the Missouri River main stem dam system as far as service to its other function is concerned. Flood control and irrigation would be fully served in either case. Power generation would be essentially the same and average power peaking capability would be increased only about 1%. Sufficient releases would be maintained for water quality control and for M&I water supply, irrespective of service to navigation. However, the higher minimum release level (15,000 cfs vs 6,000 cfs) would permit more flowthrough cooling water for new power plants to be located along the river.

SECTION III

RELATIONSHIP OF THE REMAINING CONSTRUCTION FOR BANK STABILIZATION AND NAVIGATION AND ITS ON- GOING MAINTENANCE TO LAND USE PLANS

3.01. Current land use plans that exist in the project area are associated with the urban centers bordering the river. Most of the metropolitan areas and several counties have planning agencies. The consummated zoning ordinances and land use plans as well as those being formulated were and are being developed in the presence of, and with full knowledge of, navigational activity and needs of the Missouri River. The ordinances and plans recognize bank stabilization as well.

3.02. There are no known conflicts between the remaining construction of project structures or maintenance of the navigation waterway and bank stabilization structures and existing or proposed Federal, State or local land use plans, policies and controls.

3.03. A Bureau of Outdoor Recreation report dated June, 1975, recommended national designation of the 3,700-mile route traveled by the Lewis and Clark expedition in 1804-1806 as the Lewis and Clark National Historic Trail. The completion of initial construction of the bank stabilization and navigation project or its continued operation and maintenance would not adversely affect national designation of the river between Sioux City and the mouth. In fact, development of river access (recreation) sites will complement the Lewis and Clark National Historic Trail designation and public use thereof.

3.04. The Missouri River Basin Commission has undertaken a flood plain management study of the river between Gavins Point and the mouth. The study has two phases: (a) development of a technical information base by the Corps; i.e., the hydraulics and hydrology of today's river, and (b) the affected States, through MRBC, will develop a floodplain management program including the implementation of a uniform or compatible floodplain regulation and legislation.

SECTION IV

THE ENVIRONMENTAL IMPACTS OF THE REMAINING CONSTRUCTION AND MAINTENANCE OF THE BANK STABILIZATION AND NAVIGATION PROJECT

4.01. Impacts. A number of letters of comment on the draft impact statement expressed criticism with the relationship established between "impact" and "effect" as used in the draft statement. In this final statement impacts, effects and consequences of actions are used synonymously.

Action # 1 - Placement and replacement of rock on new and existing bank stabilization and channel maintenance structures.

Action # 2 - Removal of riverbed material at specific locations.

Action # 3 - Disposal of dredged material.

Action # 4 - Operation of desired channel dimensions for use by commercial navigation interests.

Action # 5 - Placement of public recreation access facilities along the Missouri River between Sioux City, Iowa, and the river mouth.

4.02. Major Corps of Engineers and Commercial Barge Actions. Impacts, effects and consequences are identified and described under the appropriate Corps or commercial barge action. Only significant impacts and effects are detailed. These can be the direct consequence of the action or an indirect or secondary consequence of the action. (As an example, any land use change that results from bank stabilization would be a secondary or indirect consequence of bank stabilization).

4.02.1. Action # 1. Dikes and revetments are repaired in response to inspection -- noted deteriorated conditions and failures. New revetments and dikes are constructed to obtain authorized, designed channel dimensions where such dimensions have not been achieved and where such construction will minimize the probability of future dredging needs.

4.02.1.1. One direct effect of structure maintenance is to assure against river bank erosion. The beneficial, indirect effects of

preventing bank erosion include maintenance of the "highest and best" economic use and recognized social well-being on the adjoining land which on this project is typically used for intensive farming, but in specific areas includes industrial and commercial development, water intakes, bridges, highways and other such uses. A beneficial aspect of this effect is for local government to tax according to the land use, thus gaining revenue. Prevention of bank erosion also indirectly protects levees from being undercut or eroded and consequently lands from being flooded that are provided levee protection. An adverse effect which is cumulatively significant is not letting the river create additional area of potentially diverse water habitat for use by aquatic life (This would occur only if another entity would not continue with maintenance of the rock structures; see paragraph 2.06.). Low, marshy shorelands that would be invaded by volunteer riverine vegetation would also be created in association with the additional water area. This cover would be a more valuable habitat for wildlife than the present cropland within the project area.

4.02.1.2. The effect of construction of new structures, in addition to work associated with the repair of the existing structures, is the alteration of the channel configuration (generally scouring of river bed) to better accommodate commercial waterway traffic. The alteration of the main channel bed is not considered biologically significant, as the bed is typically in motion and houses only an impoverished benthic community.

4.02.1.2.1. To the extent that a small amount of new construction will be designed to reduce the river width in certain locations to achieve the designated navigation channel dimensions, a slight local increase in river velocity would be anticipated. Because the project is essentially complete and only a small amount of the remaining construction will be for this purpose at specific points on the river, it is predicted that the present overall river velocity will not be increased. The river velocity immediately adjacent to the new structures, specifically their riverward ends, will, however, increase.

4.02.1.3. A direct effect of the maintenance of structures at their design dimensions is the continuance of accreted lands that were caused by the dikes. Indirect, beneficial effects of maintenance of dikes, particularly older dikes which have accreted lands that are now in agricultural production, are the continuance of farming and associated economic benefits. An indirect, adverse effect of this condition is not allowing the river to remove a portion of the already accreted lands, and thus restore some lost water area which would probably be shallow and slow moving and thereby beneficial to aquatic life and resting waterfowl and shore birds. Another indirect, adverse effect is the continuance of the deposition process on some of the lower, older accretions, until the

accreted land reaches the general height of adjacent terrestrial lands. This land would then become available to riparian land-owners for conversion to land uses which would benefit their personal purposes at the expense of established riverine vegetation habitat which is most valuable to wildlife along the river.

4.02.1.4. Existing dikes and new dikes whose design would not be modified could cause some accretion of sediment which might further reduce the amount of water surface in the river. It is anticipated, however, that this further reduction will be quite insignificant compared to the reduction that has taken place as a result of the past action, and to the existing river surface. In fact, the present riverine habitat and floodway restoration program could result ultimately in a net increase in the present amount of surface water in the river. The effect of the new dikes on the sandy river bed will be to cause a rearrangement of bed material. Sand from the scour holes formed by concentration of flow around the riverward ends of the dikes will deposit to form underwater bars in other portions of the river bed. These effects will be local within short reaches and there will be no significant increase in sediment concentrations in the river downstream. New sills will effect little change in the river regimen. Their function is to stabilize the cross sectional shape of the river bed by maintaining the deeper portion of the channel in the locations desired for navigation. Short reaches controlled by sills will not change appreciably in average channel depth, although the cross sectional profile will be less variable from time to time than for the condition without the sills.

4.02.1.5. Utilization of quarry rock material for revetment and dike construction and repair, and the labor force and their equipment for the placement of rock is a direct effect which is beneficial or adverse, depending upon personal points of view. It is definitely beneficial in order to achieve the authorized purpose of the project. A potential indirect effect involving quarry operations is the possible destruction of archaeological resources in the quarry. Placement of quarry rock on deteriorated dikes and revetments adversely affects the established aufvuch communities on the old rock and reduces at least temporarily the acceptability of the structure as fish cover.

4.02.1.6. An insignificant, adverse effect of maintenance of project structures is the structures' contribution to supporting river stages higher than preproject river stages. (Riverbed degradation has essentially nullified this above Blair, Nebraska.) The structures have raised river stages for discharges that are within the channel banks and have a diminishing effect for higher overbank discharges. For the larger flood discharges, the major factors contributing to raised flood heights are man-made encroachments into the river flood plain — roadway fills, levees, bridge approaches, etc.

Natural levee formations also contribute to higher flood stages, as can river water temperature and the sediment load of the river at flood time. Secondly, higher stages reduce the effective level of protection provided by existing Missouri River levee systems and private levees. High stages compound interior drainage and ground water problems in some reaches of the river. The channel stabilization structures already constructed have been a direct cause of rises in stage, but this construction action has been completed and is not within the scope of the present Environmental Impact Statement. The remaining construction and on-going maintenance actions are not expected to further increase this stage effect. In fact, some reduction of stages due to the on-going actions is possible due to the lower levels to which structures are now being constructed and maintained.

4.02.1.7. The aesthetic effect of eroding banks, mid-channel islands, side channel chutes and sloughs, and sand bars versus rocklined banks and jutting dikes into a single channel river is beneficial or adverse, depending upon one's point of view. Therefore, the maintenance of the structures and channel configuration has both beneficial and adverse effects which are insignificant to the existing aesthetic setting.

4.02.1.8. Removal of snags from the river is another maintenance action associated primarily with dikes, but occasionally the main channel as well. Snags are usually deposited as a consequence of winter ice jams and flow reduction. Most of the snags come from tributary inflows and a lesser amount from main channel erosion. Snags usually add to the diversity of fish habitat of the river and in some instances individual snags may be an important contribution. Because, overall, snag removal is not extensive year-to-year, with some years seeing little if any removal from the entire length of the project, its effect on the river fish is considered to be minimal.

4.02.2. Action # 2. Specific areas where navigable depths are deficient are identified by electronic soundings from inspection boats and reports from commercial towboat operators, later verified by Corps' personnel.

4.02.2.1. The beneficial, direct effect of dredging is to remove riverbed material from locations within the main channel which would otherwise diminish the amount of commercial traffic past the location or increase the time (for both maneuvering and breaking and making up barge tows) to navigate around or through the obstructions. In recent years (since 1965) all requirements for dredging have been below St. Joseph, Missouri.

4.02.2.2. The direct adverse effects of dredging are on water quality, benthic communities, and fish. Because the material dredged is recently deposited sediment (mostly sand), "trapped" pollutant, chemical substances are not present in unacceptable

amounts in the dredged material. Therefore, increased chemical substances into the river water during dredging operations do not significantly reduce the existing quality of the river water. During Corps of Engineers channel maintenance dredging operations in August 1974, the Environmental Protection Agency sampled dredge pipe effluent at two river locations, mile 279.3 and mile 365.0. Laboratory analysis for heavy metals, nutrients, and pesticides indicated all these potential contaminants to be within the water quality standards. In addition, the Corps samples suspended solid concentrations in the river at various distances from the dredging operation and found no significant increase in concentration after one-fourth mile downstream. The main channel bottom does not contain an abundance of benthos; therefore, dredging causes no significant effects on the river's benthic community. Fish are not believed to use the main river channel to any large extent except for migration upstream and downstream. The dredging conducted by the Corps of Engineers since 1965 has been at the approximate magnitude as the dredging concurrently done by the sand and gravel industry (average about three million tons per year). In summary, the direct, adverse effects of dredging are considered to be insignificant.

4.02.3. Action # 3. Disposal sites for dredged material are determined on the basis of economic and engineering efficiency and environmental impact. The following effects are general to the lower Missouri River, but not site specific. All specific, acceptable disposal areas to be found in the lower river reach have not been identified, nor have specific areas been identified which are not available for dredged material disposal (a part of EPA guidelines published in Federal Register V 40, No. 173, 5 September 1975, assigns this task as a joint effort between EPA and the Corps of Engineers; a team of people representing EPA, FWS and Corps are working on this effort). Rather, at present, environmental assessments are made of the specific proposed disposal actions and public notices issued on representative disposal sites (see also paragraph 1.10.5.).

4.02.3.1. The direct, beneficial effect of depositing dredged material within the navigation servitude limits of the Missouri River is that acquisition of lands from the private sector is not required. This practice is the most economical practice and does not alter existing land use of adjoining lands that might be used for disposal. Disposal of dredge materials has been in open water areas between channel structures, and recently (1974) in the main channel. The main channel will be the disposal location for future dredging efforts unless the study team identified in paragraph 4.02.3 would find more environmentally acceptable and economically feasible disposal locations.

4.02.3.2. The direct, adverse effects of depositing dredged material in the river channel are expected to be insignificant. Potentially

dredged material could contain heavy metals which would be harmful to the biological populations in the immediate area and, depending upon the heavy metals and their concentration, could degrade the river water quality. (This has not happened and is not expected to occur.)

Increased turbidity which accompanies the disposal of material can restrict solar radiation penetration into the river water column, restricting the metabolism of algae. This adverse effect is temporary, lasting only as long as site specific dredging occurs. In 1974 site specific dredging required an average of five days. The effect is not considered significant.

4.02.4. Action # 4. The present commercial use of the Missouri River waterway requires Corps of Engineers work efforts identified in Actions 1, 2, and 3. All effects are induced by Corps of Engineers' actions.

4.02.4.1. A significant beneficial indirect effect of this work is the movement of commercial traffic on the river. Economic benefits accrue to barge lines themselves, to shippers of commodities because of decreased and competitive shipping rates, and to local communities because of the earnings of those employed in the river transportation and terminal business and tax revenue collected on terminal facility investments. Navigation is an alternate form of transportation potentially useful in times of national emergency when other forms of transportation might be disrupted. In this day of energy shortages, barge and towboat transportation is a highly energy-efficient way of moving commodities when compared to other modes of transportation (rail, trucks, pipelines, or airlines), except pipelines when disregarding the length of the haul.

4.02.4.2. Adverse effects of towboats and tow wakes and propeller wash on river banks and structures, including associated biological communities, or recreational boats tied to the bank or operating on the river are not considered significant at the present level of commercial traffic nor will it become significant with the completion of the project. Loose tows which break away from tows or moorings can damage other tows, recreational boats, bridge piers, etc. Spills could result should loaded barges break up causing leaks or sinkings. Spilled material could degrade the river water quality, at least temporarily, and consequently be harmful to uses of the river water by wildlife and to man's consumptive uses. Experience demonstrates that although adrift tows are somewhat more frequent in abnormally high river flows, stated adverse effects are rare occurrences.

4.02.5. Action # 5. Recreational site development occurs after a non-Federal public sponsor has acquired fee interest in the land. The Corps of Engineers usually does the engineering and design, and administers construction contracts. Sponsors can and at times do the design and construction.

4.02.5.1. The effects of altering existing land use and concentrated public activity on the developed land are not considered significant. The addition of noise, chemicals and particulates to the atmosphere by construction equipment would be insignificant. Archaeological or historical resources which could be adversely affected by recreational development are guarded by conditions of P.L. 93-291.

4.02.6. Summary of Significant Effects. Continued maintenance of structures protects against bank erosion, thus maintaining the highest and best economic use of the adjoining lands which provides the base for local tax revenue (beneficial).

4.02.6.1. Bank protection indirectly protects the numerous levees which provide a significant measure of flood protection from Missouri River flood waters (beneficial).

4.02.6.2. Maintenance of dikes and revetments protects already accreted lands from eroding to protect the riparian owner's use and occupancy of said lands which are a base for local tax revenue (beneficial).

4.02.6.3. Dikes, revetments and sills alter and maintain channel configuration to accommodate commercial waterway use (beneficial).

4.02.6.4. Dredging assists in the maintenance of the channel configuration to accommodate commercial waterway use (beneficial).

4.02.6.5. Disposal of dredged material is within the river in areas of little or no agricultural economic value and not on adjoining lands of high agricultural economic value which would otherwise serve as disposal sites (beneficial).

4.02.6.6. The maintenance of structures protecting against bank erosion prevents the river from forming additional, potentially shallow, aquatic habitat and surface water area (also serves as floodway storage), and exposing more mud/water interface (adverse).

4.02.6.7. Structure maintenance contributes to retention of river flood stages as they exist today. To this extent it can be viewed as an adverse effect.

4.02.6.8. The structures protecting against bank erosion reduce the opportunity for development of volunteer riverine vegetation that is valuable wildlife habitat in the Missouri River flood plain (adverse).

4.02.6.9. Dikes and their maintenance prevent the river from forming more, potentially shallow, water area that is valuable aquatic habitat (adverse).

4.02.6.10. Continuing accretion behind structures inhibits development of a stable riverine vegetation community. Ultimately some of the accreted land will reach an elevation that will permit conversion to cropland. Stable riverine vegetation is more valuable wildlife habitat than cropland or riverine vegetation continually being covered by accretion (adverse).

4.02.6.11. Use of new quarry rock to repair existing dikes and revetments destroys certain biological communities situated on old rocks, and temporarily diminishes the rock structures' value as fish cover (adverse).

4.02.7. Efforts to Lessen Significant Environmental Effects. Both the Kansas City and Omaha District offices of the Corps of Engineers initiated, in 1975, construction of notches in a number of existing dikes that will permit an amount of water to flow behind the dikes. The primary purpose of these "environmental notches" is to supply flow to existing water areas behind dikes and to erode at least a part of the fill that had accreted within the dike fields, thus maintaining the existing and perhaps forming additional water surface areas. The chute of water which separates the river bank from the accreted dike fill would also serve to buffer volunteer riverine vegetation from encroachment by agriculture or other economic development. A group of personnel representing Iowa, Kansas, Nebraska, and Missouri fish and game agencies, the Fish and Wildlife Service, and the Corps of Engineers was established in January 1976. Their task is to monitor the effects of the openings to determine the worth of the openings to fish and wildlife and ascertain any adverse effects on other values such as erosion of "high bank" land. Additional requirements for openings will be determined from the information the monitor group collects. The purpose of the openings is to reduce the adverse effects of reduced water surface area and to increase the diversity of aquatic habitat in the Missouri River.

4.02.7.1. Under the authority of the Fish and Wildlife Coordination Act of 1958, the Corps of Engineers have initiated an investigation of the fish and wildlife impact that has accrued since 1945 due to the construction of the bank stabilization and navigation project. It is the charge of the study to identify all reasonable efforts to compensate for losses that are identified. The Fish and Wildlife Service, in cooperation with the adjoining states' fish and wildlife agencies, is making a similar investigation and will furnish the Corps of Engineers a report of its investigation and its recommendations for mitigative measures. The feasibility report will be forwarded to the Office of the Chief of Engineers for processing to the Congress. The mitigation efforts will concentrate on minimizing the adverse effects of reduced water surface, loss of the diversity of the river's aquatic habitat, and the loss of riverine wildlife habitat to the extent that the loss is attributable to the construction and maintenance of the bank stabilization and navigation project.

4.02.7.2. Dredging is subject to Section 313 of the Federal Water Pollution Control Act (33 U.S.C. 1323, 86 Stat. 816). In addition, Federal Regulation 33 CFR 209.145 requires that a public notice be issued advising interested parties of dredging proposed by the Corps of Engineers. This provides interested persons 30 days to submit written comments on the proposal; a public hearing to air the proposal can also be requested. During 1974, dredged material was disposed of in the main channel on two separate occasions, anticipating that the material would be deposited downstream in the deeper parts of the main channel. The disposed material did not adversely affect the river's shallow water areas or decrease the water surface area, nor did it reduce the efficiency of the main channel to accommodate towboat and tow traffic. Future dredged material disposal will be confined to open water away from the river bank and away from quiet, shallow water areas. This should ensure that dredged material disposal will not have significant adverse environmental effects.

SECTION V

ANY ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

5.01. Past actions, in particular initial construction actions, to stabilize the river banks and provide the authorized navigation channel dimensions have left the river with about one-half of its original water surface and significantly altered the amounts of important fish and wildlife habitat types found in the project area. The objective of the current fish and wildlife mitigation study is to identify justifiable means and measures which would minimize these adverse effects.

5.02. The direct adverse effects of the on-going maintenance which cannot be avoided include further reduction of riverine habitat caused by minor accretion induced by dikes and revetments and the disruption of biologically favorable habitat (fish cover) and established, attached aquatic communities on existing rock dikes and revetments by placement of new rock during the repair operations.

5.03. On-going maintenance of river structures prevents erosion of the river's high banks which otherwise could form shallow, relatively quiet water areas, some of which support semi-aquatic vegetation. This habitat type is valuable to both fish and wildlife in the project reach of the Missouri River.

SECTION VI

ALTERNATIVE PROGRAMS TO THE MISSOURI RIVER BANK STABILIZATION-NAVIGATION PROJECT

6.00. General. Alternatives to completing construction and continuing maintenance of the Missouri River Bank Stabilization and Navigation project include: (1) termination of the remaining construction and maintenance actions that support the navigable waterway as a project function; (2) terminate all Federal actions in support of the navigation function, the bank stabilization function and recreation; and (3) although not an all encompassing alternative, structure modifications to reduce adverse environmental effects. These are discussed below.

6.01. Termination of the Navigation Function of the Project, but Retention of the Bank Stabilization Function. A decision to terminate only the navigation function of the project would have to be made by the U. S. Congress. As stated in Section II, the operation of the Missouri River main stem dams would not be altered in any significant way with the navigation function terminated. The underwater sills serve only the navigation function, as do the so-called "crossing" and "kicker" structures which are positioned near the downstream end of river bends. The riverward ends of dikes along the insides of bends are also required for navigation; the landward "roots" of these structures, however, support bank stabilization. L-head dikes and revetments along the outsides of bends serve both bank stabilization and navigation, since they scour the navigation channel as well as divert the current from eroding the bank. It is believed that if the navigation function were terminated, portions of the L-head dikes and revetments would not have to be maintained to support the bank stabilization function. Removal of snags from the river, principally a navigation function, would be terminated. Dredging is also a navigation function that would be terminated. Occasional dredging could continue in the vicinity of steam power plant and municipal water supply intakes, but to insure adequate water supply, not to support navigation. As a result of the lack of maintenance of the river structures required for navigation, and assuming no maintenance by the commercial barge industry, the river channel would be at liberty to meander back and forth between the maintained river banks.

6.01.1. The Federal Government would incur savings of the annual maintenance costs of the structures required for navigation, snagging costs, and emergency dredging costs, which would amount to one-fourth to one-half of the total project maintenance cost presently expended in a given year. (This figure is based on an analysis of maintenance costs incurred for the fiscal years 1971

through 1975, assuming the separation of structure requirements to accommodate the two project functions that are identified in paragraph 6.01). These savings, it is believed, would be offset by increased costs of goods due to increased transportation costs. The stabilized banks do contribute indirectly to navigation since they reduce erosion and its contribution to sediment in the navigation channel. The availability of navigation not only provides a competitive mode offering a cheaper means of transportation, but also induces competing modes to lessen their transportation rates, significantly reducing the cost of transportation to the shippers and receivers of goods. Industry, business, and unemployment losses would be felt as well. Nearly 75 commercial barge terminal facilities are currently in operation on the Missouri River with somewhat less than 60 percent of these facilities also having access to the rail mode. It must be concluded that those facilities without rail access would find it difficult to remain competitive due to the requirement to incur costly truck charges or large capital expenditures for rail spur construction. It is likely that most would cease business operation. Those operations with rail access would have a readily accessible alternative. However, the loss of the more competitive waterway mode would provide a loss of competitive position for these facilities, resulting in likely business losses and potential shutdown. The most severe impacts would occur within the directly related waterway industry firms, via plant or firm shutdown, labor force unemployment, and the resultant adverse impacts on the economic base of the affected communities. The transportation service now provided by the waterway industry would still be required.

6.01.2. Discontinuance of the navigation function but retention of bank stabilization would have little effect on altering the intensive use of the adjoining river bottomland. Therefore, the biological setting of these lands would not be expected to change from the present-day setting discussed in Section II. Because the river would be allowed to meander between its maintained channel banks, the amount and distribution of the more critical river habitat types would be expected to increase - shallow, slow moving water area would increase, sand bar area would increase, marsh area would increase - at the expense of existing deep navigation channel and low land area between the navigation-required dike structures. The changed habitat types would benefit the aquatic biological community, principally by supporting increased production of fish and other aquatic life, and by permitting a more stable biological community due to better distribution of these more critical habitat types. The wildlife inhabitants of the Missouri River marshes would also benefit from the habitat changes that would occur. The benefit would be in the form of an increase in species numbers and by more stable populations of the species.

6.02. Terminate Existing and Future Action. The decision to terminate the Federal action necessary to continue the Missouri River

navigation and bank stabilization project would have to be made by the U. S. Congress. As explained in paragraphs 2.06.1, 2.06.2, and 2.06.3, the operation of the Missouri River main stem dam system would not be altered in any significant way. Water releases from the main stem system would not change significantly from the present release pattern. Deterioration of the present channel configuration would occur, and lead eventually to curtailment of navigation as presently practiced. The de-stabilization of the river channel and banks would also cause stress to the present intensive uses of the river bottomlands adjoining the river.

6.02.1. Physical change in river channel configuration would be expected without rock structure maintenance. The above-water part of the rock structures would deteriorate slowly over a period of years. High river flow through these areas of deterioration could cause new river chutes to form. The underwater portion of the rock structures would deteriorate more slowly, but when such structures failed, river banks would not remain stabilized and would begin to erode. Above the mouth of the Platte River, Nebraska, the eroded high bank lands would not be replaced by accretion because the continued operation of the main stem system holds back sediment-laden flood flows which once were the source of river bottomland formation. Sand bars and other low elevation lands would, however, be formed. The present degradation trend of the river bed from Sioux City downstream to about Blair might be arrested by accretion from bank erosion and reduced river forces (current) as a result of channel changes, chute formations, and establishment of river vegetation.

6.02.2. It would seem reasonable to expect that more frequent flooding of river bottomland and the threat of bank erosion would reduce the intensity of agricultural use of the land adjacent to the river and, together with termination of commercial navigation, would also result in the discontinuance of all commercial barge terminals. Active bank erosion adjacent to agricultural levees would require their landward relocation, reducing the amount of agriculture lands on the river bottom protected from flood waters (presumably the more valuable agricultural lands) and cause a decline in agricultural production. Where such relocations would not be timely, the levees could be breached by bank erosion, chute development or major river channel change. Another possibility would be non-Federal efforts to preserve the existing alignment (Para. 6.02.4.).

6.02.3. It is expected that the change of the physical character of the present river channel and of the adjoining bottomlands (at least those lands under intensive use) which would be occasioned by discontinuance of the project would be toward increasing the amount and the distribution of the more critical fish and wildlife habitat types. These habitat types include shallow, slow moving water areas used for fish and fish food production, marsh, and

riverine woodland of dense understory used for food production for some wildlife and as nursery and escape cover for many different wildlife species. The increase of these more critical habitat types would be at the expense of the overly abundant, non-critical habitat types of river channel (deep, swift water over a shifting sand bottom) and cultivated agricultural land. The result of increased amounts of the currently more critical habitat types would be toward an increase in the size of the fish and wildlife population of the river and adjoining bottomland, and a more stable fish and wildlife population as well.

6.02.4. The project is essentially complete and the bank stabilization and navigation structures are in place and functioning. It is believed that deterioration of the structures and of the river character would occur with time, and in places not at all. The navigation function would most likely be lost first because the structures needed to preserve the function include the underwater dikes protruding into the channel which are more difficult and costly to maintain than other river structures. Dredging which is occasionally necessary, requires specialized and operationally expensive equipment. (A general description of the adverse effects of the loss of navigation is presented in paragraph 6.01.1.). The stabilized bank condition as a general river condition would remain much longer than the navigable condition (channel dimensions). The benefit of the stabilized bank is directly related to farm operators and groups of farm operators (levee districts, for example), and other intensive land users individually, rather than identifiable only to the agri-business industry in general. It is believed these individuals would perform maintenance of the existing structures which, for the most part, can be accomplished from the land using a variety of materials -- car bodies, concrete rubble, timber, rock borrowed from other river structures, etc. These individuals would probably also apply pressure to State government for assistance with maintenance too large for the individuals to accommodate. In the long term, major channel changes, new chute development, and increased flood frequency and associated higher river stage would probably overcome the individual maintenance efforts. However, there would be many reaches along the river where these forces would not overcome the individual maintenance efforts. There, the banks would remain stabilized, and the intensive use of adjoining river bottomland would continue with the river channel meandering between the high, privately protected river banks.

6.03. Modification of the Project Structure Design to Reduce Adverse Environmental Effects, and Maintenance Costs. Although modification of design is not an alternative of the authorized Federal action (it can be accommodated without abandoning authorized functions) it is discussed in this Section because it can materially influence the maintenance activities and alter the subsequent environmental effects on the river's fish and wildlife inhabitants. The environmental notch, permitting water to flow through certain structures, is one such modification. New structure height criteria reducing the elevation that dikes will be maintained have already been implemented.

Further reduction in dike heights are probable once field experience with the present new criteria has been evaluated. A reduction of the overall number of dikes to be maintained may also be possible. Such modifications, if found engineeringly feasible, would reduce maintenance costs, reduce the amount of material (rock) that would be committed to the project, and reduce the amount and elevation of lands accreted downstream and behind dikes. Such modifications are continually being investigated and are implemented as the Corps' river maintenance experience demonstrates their biological and economic feasibility.

6.04. Changes in Draft of Towboats and Barges. Reduction in draft of commercial craft used on the Missouri River would permit operation on a navigation channel less than the authorized nine feet. This approach was, as a practical matter, demonstrated during early years of the project when loadings of about seven feet were a necessity at times. It was also demonstrated then that a sustained limitation of seven feet or less of draft makes navigation economically infeasible for the operators. Therefore, it is doubtful that a separate, shallow drafted commercial barge and towboat fleet would be developed.

SECTION VII

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

7.01. The Missouri River Bank Stabilization and Navigation Project involves the use of the area's natural resources (water and land) for the economic and recreational benefit of man. This use results in adverse impacts on the area's terrestrial and aquatic flora and fauna. Individually, some proposed actions will curtail biological productivity during the short-term. If the future is a reflection of the past, it should be anticipated that there can be an irretrievable loss of river-fringe woodland as an indirect result of the completion of construction of the project and of the continuing maintenance. (Probably less than 50 acres of clearing of existing woodland will be necessary to accommodate the remaining construction; no additional clearing of old stand timber will be necessary for maintenance of the existing structures). The amount of such land use change which can be indirectly contributed to the proposed actions is not expected to be significant; however, the adverse effect is considered by some to be a curtailment of biological productivity. Specific benefits and impacts are briefly discussed in the following paragraphs. The project does clearly benefit navigation on the Missouri River. Both economic and social benefits are derived from this. They include (1) continued wages and taxes from the industries that have located in the area because their goods move more economically on the Missouri River than by alternative modes of transportation, and (2) the lower costs of commodities because of their being shipped on the Missouri River than by an alternative method of transportation.

7.02. Short-term effects of dredging on the aquatic environment include increased local turbidity, the release of pollutants contained in the sediments, and elimination of benthic organisms and fish habitat diversity. Alteration of the aquatic habitat may be viewed as either short-term or long-term. Although fish may return to dredged areas soon after dredging ceases, their continued success and productivity are contingent on the availability of food organisms, including benthic macroinvertebrates. The time required to re-establish benthic populations is largely dependent on water quality, water temperature, and available substrates, both of which are adversely affected by dredging. Because of the relatively infrequent dredging operations in the Missouri River, short-term effects on the benthic community can be anticipated.

7.03. In the long-term man's productivity, particularly by his intensive use of the project reach's flood plain lands, will be enhanced by the continuance of the project (maintenance). This productivity will be achieved by conducting the maintenance actions described in paragraphs 1.10 through 1.10.6. There are continuing short-term impacts described in Section IV which will result from the actions. Many of these may last as long as the project; therefore, the impacts might be classified as long-term.

SECTION VIII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

8.01. The proposed action, particularly the on-going maintenance of the dikes and revetments, will prevent the river from eroding the high bank lands to any significant degree thereby not permitting the formation of low bank sand bars and islands or shallow water areas. Because the project structures are in place, it is not believed that the private sector, to the extent of its capability, would permit their decay to the point that adjoining private land and developments would be destroyed leaving significant amounts of low bank features even if the Federal action were to be terminated. From a very real sense, the millions of tons of rock and other maintenance material to be used cannot be recovered after being in place for a period of time. The fossil fuel used to conduct the maintenance activities, once used, is irretrievable. The quarried bluffs which supply the bulk of the maintenance material cannot be rebuilt to their former dimensions, contour and vegetative cover.

SECTION IX
COORDINATION WITH OTHERS

9.01. Government Agencies and Conservation Groups. During recent years coordination efforts between the Corps of Engineers and Federal and State agencies have centered on dredging and dredge disposal spoil needed for the navigation portion of the project, construction of new river structures, and the fish and wildlife mitigation study. Public notices have been issued under provisions of Federal Regulation 33 CFR 209.145 pertaining to disposal of dredged or fill material within the project reach of the Missouri River. Issuance of similar public notices in future years to accommodate disposal of dredge or fill material can be expected.

9.01.1. The Kansas City District issued its first public notice under provisions of the Federal Regulation pertaining to dredge material disposal on 4 September 1974. Prior to issuing this notice, Kansas City District held a meeting with representatives of EPA, Fish and Wildlife Service and Missouri Department of Conservation to determine acceptable types of disposal sites. Public notices were issued in anticipation of the need for dredging on 14 February 1975, 16 April 1976 and 25 April 1977; dredging, as it turned out, proved unnecessary. Copies of each year's public notice was distributed to about 250 Federal, State and local agencies, Congressional offices, local news media and U. S. Post Offices.

9.01.2. Separate public notices have been issued by both Omaha and Kansas City Districts notifying of the Corps' intention to construct new bank stabilization and navigation structures (addition of fill material in navigable waters). The publics and agencies reached by these public notices were similar to the audiences of the dredging public notices.

9.01.3. On 24 September 1974 another coordination meeting was held between the Corps and fish and wildlife interests. The meeting was held in the Corps' Missouri River Division Office and the following agencies attended: U. S. Fish and Wildlife Service (Kansas City, Denver, Pierre Offices); Environmental Protection Agency; National Park Service; Kansas Forestry, Fish and Game Commission; Missouri Department of Conservation; Nebraska Game and Parks Commission; South Dakota Department of Game, Fish and Parks; and the Iowa Conservation Commission. The fish and wildlife interests expressed their concern over past and continuing losses of shallow water habitats behind and between dike structures and the overall lack of quiet water areas in the river beneficial to fish and waterfowl. Some concern was also expressed over lack of

IX-1

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recreational access to the river. Corps personnel gave a summary of river engineering considerations, and a summary of recently completed Corps sponsored environmental inventory studies. Progress toward the completion of a draft environmental statement for the project was also discussed. Corps efforts to protect and maintain shallow water areas in the river were discussed. The 22-25 April 1977 inspection trip has been the most recent trip in which the State and Federal fish and wildlife agencies, and EPA participated. In addition to coordination activities primarily concerning maintenance dredging, representatives from state fish and game agencies, the U. S. Fish and Wildlife Service, and the Environmental Protection Agency have been included in general river inspection trips involved with the bank stabilization portion of the project. These people have indicated a continuing interest in the river, and will be included in future river inspections.

9.01.4. On 22-24 October 1974, representatives from the Iowa Conservation Commission, Nebraska Game and Parks Commission, the U. S. Fish and Wildlife Service, and the Environmental Protection Agency met with Omaha District personnel to review the Missouri River project. Two days were spent on the river, reviewing the project. A major concern expressed by these groups was the continuing loss of shallow water habitat in the river due to the project. Shallow water areas behind structures, and in small chutes and backwaters were pointed out as areas to preserve or maintain free of sediments.

9.01.5. A meeting was held on 22 November 1977 to discuss the first year's progress of the cooperative environmental notch studies. Agencies represented at the meeting included Fish and Wildlife Service, Iowa State University, Kansas Fish and Game Commission, University of Kansas, Nebraska Game and Parks Commission, EPA, University of Missouri, and the Corps of Engineers. The study participants confirmed and stressed the need to create quiet, shallow water habitat in the project reach of the river. Several suggestions of the participants relating to the design of notches will be tested by the Corps in its movable bed working model of the river at Mead, Nebraska, for the purpose of refining the design of notches so that they might better accomplish their purpose. Biological and physical monitoring of notches in place will continue in 1978 and a second progress meeting will probably be held at the end of the 1978 study season.

9.02. Public Participation.

9.02.1. A series of public workshops to discuss the Missouri River project were held during the second and third weeks of August 1974 by the Omaha and Kansas City Districts of the Corps. The purpose of the workshops was to involve interested agencies and groups and the public in identification of key issues and alternative plans of action concerned with the construction of the last phases of the project and with its continued operation and maintenance.

9.02.2. Kansas City District workshop meetings were held on 13 August in Kansas City; 15 August in St. Charles; 20 August in St. Joseph; and on 22 August in Jefferson City. Attendance at the above-mentioned meetings was 19, 11, 31, and 23 people, respectively. Information letters describing the upcoming workshops were sent on 19 July 1974 to 85 Federal, State, local agencies, commercial interests and environmental groups concerned with the Missouri River. A news release describing the meetings was prepared on 8 August 1974.

9.02.3. Omaha District meetings were held in Nebraska City, Nebraska, on 27 August; in Omaha, Nebraska, on 28 August; and in South Sioux City, Nebraska, on 29 August. Two meetings, one in the afternoon for agencies and recognized groups, and one in the evening for the general public were held at each site. Attendance at the meetings was light, with 42 people attending at Nebraska City; 10 people in Omaha; and 14 people in South Sioux City. A letter was sent to interested Federal, State, and local agencies and groups on 22 August informing them of the workshops. A news release on 22 August 1974 informed the public of the meetings.

9.02.4. A number of public meetings were held in the spring of 1977 at numerous towns along the Missouri River within the project reach to inform those in attendance of the initiation of the Corps fish and wildlife mitigation study and of the Corps effort to update its recreation master plans for the project reach. The meetings also served as a call for information on the subjects. The initial meeting was held on 23 February 1977 at St. Charles, Missouri, with ensuing meetings at Jefferson City, Missouri, Fort Leavenworth, Kansas, Plattsmouth, Nebraska, Sidney, Iowa, Peru, Nebraska, Omaha, Nebraska, Council Bluffs, Iowa, Sioux City, Iowa, Tekamah, Nebraska, and the last one held on 29 March 1977 at Missouri Valley, Iowa. The Tribal Chairmen and tribal representatives of the Omaha and Winnebago Indian Tribes were informed of the same subjects on 22 March and 30 March 1977, respectively. Another series of public meetings are anticipated to be held in 1978 to present all interested parties of the findings of the two studies.

9.02.5. There have been numerous meetings and joint river inspections between representatives of the Omaha and Kansas City District and representatives of other agencies and environmental groups, as well as private individuals. These have included river inspections of various segments of the river, and addresses and panel discussions at meetings of such groups as the Sierra Club and American Fisheries Society. During 1977 the District Engineer, Kansas City, participated in a Sierra Club seminar in Kansas City on 5 February; addressed the Missouri Chapter of the American Fisheries Society in Columbia, Missouri, on 18 February; was participant in a seminar at the Missouri Wildlife Conference annual meeting on 2 April; conducted a river inspection trip for Missouri and Kansas Congressional staff in the Kansas City area on 27 April; and on 3 to 4 June, and 25 to 27 August,

conducted a river inspection in the Jefferson City to Mouth reach for representatives of Missouri Department of Conservation, Missouri Department of Natural Resources, Environmental Protection Agency, Fish and Wildlife Service, Congressional staff members, Sierra Club, League of Women Voters of Missouri, Coalition for the Environment, National Audubon Society, Conservation Federation of Missouri, and other individuals who had previously expressed an interest in the project.

9.02.6. From April 1976 to November 1977 representatives of the Kansas City District were active members of a River Development Feasibility Study made by the Mid-America Regional Council (MARC) of greater Kansas City. The District Engineer, Kansas City, is also an ad hoc member of the committee on River and Port Development of the Kansas City, Missouri, Chamber of Commerce.

9.03. Draft Impact Statement Review. The draft statement was furnished to the following agencies and groups:

Federal Agencies

- U. S. Department of Agriculture
 - Forest Service
 - Soil Conservation Service
- U. S. Department of the Interior
 - Bureau of Reclamation
 - Bureau of Land Management
 - Bureau of Indian Affairs
 - Bureau of Sports Fisheries and Wildlife
 - Bureau of Outdoor Recreation
 - Geological Survey
- U. S. Department of Health, Education, and Welfare
- U. S. Department of Defense
 - Army Corps of Engineers, Kansas City District
 - Army Corps of Engineers, Omaha District
- U. S. Department of Transportation
 - Regional Federal Highway Administration
- U. S. Coast Guard
- U. S. Department of Housing and Urban Development
- U. S. Department of Labor
 - Occupational Safety and Health Administration
- U. S. Department of Commerce
 - National Oceanic and Atmospheric Administration
- Environmental Protection Agency
- Water Resources Council
- Advisory Council on Historic Preservation
- Federal Energy Administration
- Missouri River Basin Commission
- Natural Resource Economics Division
- Bureau of Domestic Commerce

State Agencies

Kansas Water Resources Board (all State agencies)
Missouri Commissioner of Administration (all State agencies)
Missouri Office of Planning & Programming (all State agencies)
Iowa State Clearinghouse (all State agencies)

Local Groups and Individuals

In addition to the above, numerous other organizations and individuals whose names are listed on Environmental Statement mailing lists received a copy of the project EIS.

9.04. Letters of Comment on the DEIS were received from the following agencies, citizen groups and individuals.

Advisory Council on Historic Preservation
Bureau of Indian Affairs
Department of Health, Education and Welfare
Department of Housing and Urban Development
Department of Interior, Missouri Basin Region
Environmental Protection Agency
Federal Power Commission
Forest Service, Colorado
Forest Service, Pennsylvania
Geological Survey
NOAA (National Weather Service)
Soil Conservation Service, Iowa
Soil Conservation Service, Kansas
Soil Conservation Service, Missouri
Soil Conservation Service, Nebraska
United States Coast Guard
U. S. Department of Transportation, Regional Representative
Boonslick Regional Planning Commission
Iowa Conservation Commission
Iowa Dept of Trans. (thru Office of Planning & Programming)
Kansas Water Resources Board
Missouri Dept of Conservation (thru Office of Administration)
Missouri Dept of Nat. Res. (thru Office of Administration)
Nebraska Office of Planning and Programming
Omaha-Council Bluffs Metropolitan Area Planning Agency
St. Charles, Missouri
Siouxland Interstate Metropolitan Planning Council
St. Joseph, Missouri
Executive Committee, Western Railroad Traffic Association
Missouri Chapter of the American Fisheries Society
Missouri River Passenger Excursions, Inc.
The American Waterways Operators, Inc.
Thomas A. Milne, Kansas City, Kansas

9.05. Letters of Comment on the DEIS and Corps of Engineers, Missouri River Division, responses. (See following pages).

Advisory Council
On Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

COMPS OF ENGINEERS RESPONSES

July 28, 1976

Mr. Gus J. Karabatsos
Chief, Planning Division
Department of the Army
Missouri River Division
Corps of Engineers
P.O. Box 103, Downtown Station
Omaha, Nebraska 68101

Dear Mr. Karabatsos:

Thank you for your request of May 6, 1976, for comments on the environmental statement for the Missouri River Bank Stabilization-Navigation Project.

Pursuant to our responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969 and the Council's "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800), we have determined that your draft environmental statement appears adequate concerning our area of interest. Individual construction projects should be surveyed for cultural resources and the Council's procedures complied with as appropriate.

Should you have any questions on these comments or require any additional assistance, please contact Charles Spilker of the Advisory Council staff at 202 734-3380.

Sincerely yours,



John D. McDermott
Director, Office of Review
and Compliance

Your comment is acknowledged.



United States Department of the Interior
BUREAU OF INDIAN AFFAIRS

ABERDEEN AREA OFFICE
115 FOURTH AVENUE S.E.
ABERDEEN, SOUTH DAKOTA 57401

IN REPLY REFER TO:
Environmental
Quality

MAY 28 1976

Mr. Gus J. Karabatsos
Chief, Planning Division
Corps of Engineers
Omaha, Nebraska 68100

Dear Mr. Karabatsos:

We have reviewed your draft environmental impact statement for Continuing Construction and Operation and Maintenance of the Missouri River Bank Stabilization and Navigation Project.

We have obtained comments from our Agency at Winnebago, Nebraska, which indicate no adverse affects to trust lands; however, in order to assess the impacts of continuing construction in the area of Thurston County where the largest concentration of Indian population exists, we would request further detail on the proposed recreation facilities from "66 Glover Point Bend to #13 Pelican".

From the enclosures to the statement this added information is needed and would seem to cover our specific area of interest in this statement.

Sincerely yours,

Harold J. Zepher
Area Director

CORPS OF ENGINEERS RESPONSES

As stated in paragraph 2.04.6.3, the existing recreation plan initiated in 1964 is being updated. Public meetings addressing the updating were held in March 1977. The Indian population had opportunity for input at these meetings, and as potential sponsors of development through their Agency, can significantly influence the kinds of recreational activities to be accommodated and the numbers of facilities to be developed.



DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
REGIONAL OFFICE
ROOM 300, FEDERAL OFFICE BUILDING, 711 WALNUT STREET
KANSAS CITY, MISSOURI 64101
June 29, 1976

REGION VII

Mr. Gus J. Karabatsos
Chief, Planning Division
Department of the Army
P.O. Box 103, Downtown Station
Omaha, Nebraska 68101

Dear Mr. Karabatsos:

This office has reviewed the draft environmental impact statement for the Missouri River Bank Stabilization Navigation Project dated April, 1976, and based on the general information contained it appears that there is no direct impact on HUD projects. However, since it is difficult to identify specific actions and locations we reserve our final determination until more specific information is available.

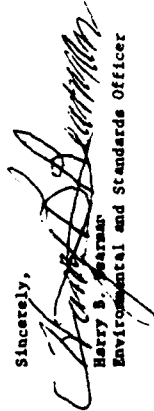
We are particularly concerned about open space projects in conjunction with specific proposals and could supply a list of HUD approved projects to the Corps upon request. It is suggested that the Corps should coordinate this undertaking with affected communities participating in the Community Development Block Grant Program to determine, if any, the impact of project activities related to specific community development projects.

Further, the statement does not discuss impacts on the proposed Lewis and Clark National Historic Trail which generally follows the alignment of the Missouri River. The designation of the 3,700 mile route of the Lewis and Clark Expedition as a National Historic Trail should be included within all Federally administered programs and projects.

Finally, the Federal Flood Insurance Program established flood plain management requirements for defined flood hazard areas and should be considered as an alternative.

Thank you for the opportunity to comment on this project.

Sincerely,


Harry B. Pearson
Environmental and Standards Officer

AREA OFFICES
KANSAS CITY, KANSAS, OMAHA, NEBRASKA, ST. LOUIS, MISSOURI
Insurance Office
Des Moines, Iowa, Topeka, Kansas

CORPS OF ENGINEERS RESPONSES

IN REPLY REFER TO:
7CE

1 Agree that the statement should show the interface between the Lewis and Clark National Historic Trail proposal and the maintenance and remaining construction of the bank stabilization and navigation project; see paragraph 3.03.

2 The proposed Federal action addressed in this EIS is a bank stabilization and navigation project, not a flood control project.



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

REGION VII
FEDERAL BUILDING
901 EAST 12TH STREET
KANSAS CITY, MISSOURI 64106

OFFICE OF
THE REGIONAL DIRECTOR

June 11, 1976

Mr. Gus J. Karabatsos
Chief, Planning Division
Department of the Army
Missouri River Division,
Corps of Engineers
P. O. Box 103, Downtown Station
Omaha, Nebraska 68101

RE: Draft Environmental Impact Statement
Continuing Construction and Operation and Maintenance
Missouri River Bank Stabilization and Navigation Project

Dear Mr. Karabatsos:

Review of the referenced Draft Environmental Impact Statement would indicate that the on-going construction and operation and maintenance of the Missouri River Bank Stabilization and Navigation project will have no apparent impact on the programs of the Department of Health, Education, and Welfare.

Further, it would appear that the impacts of the proposed action and the reasonable alternatives have been adequately addressed.

Thank you for this opportunity to review and comment on the action being carried out.

Sincerely,

William H. Henderson
Regional Environmental
Officer

Your comment is acknowledged.



United States Department of the Interior

OFFICE OF THE SECRETARY
MISSOURI BASIN REGION

IN REPLY REFER TO
ER 76/455

BUILDING 87, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

JUL 9 1976

Dear Mr. Karabatsos:

In response to your letter of May 7, 1976, requesting the Department of the Interior's review and comment on the draft Environmental Impact Statement for the Missouri River Bank Stabilization-Navigation Project, Iowa, Nebraska, Kansas, and Missouri, we offer these comments for your consideration.

General Comments

The draft statement adequately describes the existing fish and wildlife resources associated with the channelized stream. However, this becomes rather meaningless unless placed in contrast with an equally comprehensive treatment of preproject fish and wildlife conditions.

Therefore, it is recommended that additional comments be made concerning the fish and wildlife resources that were present before the project was started.

Specific Comments

Section I, Description of the Project

Page 1-1, paragraph 1.05

We note that the project is 89.7 percent complete. How many recreation-access sites were initially approved for construction? Does this figure include construction on recreation projects such as the river-access sites? It is not clear if this percentage of completion includes the recreation portion of the project. It would also be helpful if the statement indicated the level of recreation use prior to construction to show a comparison with recreation use following construction.

CORPS OF ENGINEERS RESPONSES

As stated in the Syllabus, the subject of this EIS is the proposed Corps action of completing the initial development of the project and impacts associated with this proposed action. A separate, on-going study by the Corps of Engineers in consultation with the States within which the project is located and the Fish and Wildlife Service is identifying the impacts of the construction of the project from its initial construction start to completion of the construction on the area fish and wildlife and their habitat. The study will also formulate a plan to mitigate the project's adverse effects on the fish and wildlife for presentation to Congress.

Eleven recreation access sites have been constructed along the river within the project reach. All of these sites offer boat access to the river and include automobile parking and sanitary facilities. Most of the sites offer camping and picnicking facilities in addition to the boating access. Sites and their development must be sponsored by a non-Federal public entity before the Corps can design the facilities and initiate their construction. Sponsorship involves furnishing the land, contributing 50% of the cost of construction and agreeing to operation, maintenance and replacement of the facilities. None of the remaining 56 recreation sites have a sponsor; therefore, their design and construction is awaiting sponsorship. This recreation program addresses conditions as they currently exist and is geared to the projects characteristics. Recreation before and after is not too relevant.

Page 1-2, paragraph 1.07

The statement indicates that, among other activities, fishing and hunting are classed as recreational use. It is correctly pointed out that the project has destroyed the pristine character of the river along with most of the associated valuable fish and wildlife habitat. Along with the loss of environmental amenities, the lack of ready access to the channelized stream is discussed. The statement also covers the restricted summer use due to high stages and the diminished quality of late fall hunting. In fact, it is stated that "without a doubt much more recreational use occurs on land not formally devoted to or developed for recreation than occurs on recreation-developed lands." Yet, in spite of this dismal picture, \$1,815,000 is being claimed annually as "recreational benefits." The final statement should contain a complete analysis and justification for assigning "benefits" to fish and wildlife resources, and the term should be defined in the context used by the Corps.

Detailed information on how these figures were determined would be helpful. For example, recreation benefits are for structures now existing and are derived from Corps of Engineers preliminary reports dated 1964 with costs updated to 1976. Projected annual recreation visitation and recreation-day values should be displayed. It would also be desirable if visitation and values for recreation were shown independently of fish and wildlife visitation and values.

Therefore, we believe that for recreation to be a benefit, the amount of recreation realized from the "with the project" condition would have to exceed those that could have been realized from the "without the project" condition. We doubt that the project has provided or can provide net recreation benefits, and we find it illogical to claim "recreational benefits" since the natural Missouri River ecosystem would provide recreational opportunities far in excess of the channelized stream.

Page 1-6, paragraph 1.10

This paragraph should acknowledge the proposed Lewis and Clark National Historic Trail that follows the Missouri River. Can river-access sites for recreation be incorporated with Interpretive Centers and historic points along the trail corridor? If so, the statement should reflect this. The draft Environmental Impact Statement for the Proposed Lewis and Clark National Historic Trail (DES 75/50), prepared by the Bureau of Outdoor Recreation, Mid-Continent Region, is now circulating for comments.

Section 11, Environmental Description

Page 11-1, paragraph 2.01

It is true that early man used the river, but he used the river in its unspoiled, natural condition - very much unlike modern man. It is misleading to compare modern use of a completely altered, channelized river with early use of a natural, unchannelized river.

CORPS OF ENGINEERS RESPONSES

Prior to the authorization of this project there was no effort to measure recreational use. This was not initiated until the Flood Control Act of 1962 (see para. 1.02.1.). The comment on "illogical benefits" is a very subjective term. The benefits claimed here are for specific residential developments and uses geared to the river as it is today. Pre-1945 recreation uses were of a different kind and have nothing to do with this project. Actions being pursued here are in consonance with Congressional authorizations.

Agree, see paragraph 3.03.

The Historical Setting of the project area as presented in Section 11 is not intended to be used for comparing man's use of the river and its bottomland in the past with his use of the area and its resources today, although the function the river served man of the past is quite similar to the function the river serves man today. The Historical Setting is intended to establish that items of cultural interest have been left by earliest man, that many of these items are found on the river's high banks and thereby not subject to impact by the remaining construction and project maintenance that is being proposed.

CORPUS OF ENGINEERS RESPONSES

Page 11-5, paragraph 2.03.2

Beaver and muskrat are important mammals that should be included as typical of the riverine, woodland environment.

Added.

Page 11-6, paragraph 2.03.4.1

The list of species of amphibians and reptiles common to the project includes Blanding's turtle and map turtle. Both species are listed as endangered in Missouri by the Society for Study of Amphibians and Reptiles. The primary cause is habitat destruction. No mention was made of these species in paragraph 2.03.5. It is suggested that references to herpetological publications be used to determine the endangered and threatened amphibians and reptiles.

The status of the two turtles are noted and both are recognized to reside along the Missouri River - paragraph 2.03.4. Only Federally recognized threatened and endangered species are set aside in this EIS. Although each State in the project area, Nebraska, Iowa, Kansas, and Missouri, maintains a listing of species which are rare or endangered in that particular state, the species may not be of the same status throughout the project area.

Page 11-6, paragraph 2.03.6

Areas of relatively shallow and quiet water do exist behind dikes; however, project design is such that these areas will eventually silt in completely, except for a relatively small area immediately behind and around the end of the dike. Notching, now underway, will almost certainly alter this process. Rock dikes do provide a type of relatively diverse habitat but not as diverse as chutes and sloughs adjoining the main channel, and tributary confluences. This paragraph states that chutes and sloughs appear to be the most productive of river habitats. This is true and indicates their diversity. While it is also true that the uneven rock/water interface associated with dikes causes small and frequent eddies to occur, it is doubtful that these areas allow small fish to move upstream with comparative ease.

Noted.

Page 11-12, paragraph 2.04.7

The discussion of commercial fishing needs clarification. It may be true that the Missouri Department of Conservation has reported a statewide decline in all commercial fishing including the Missouri River; however, the final statement should be more specific toward the channelized Missouri River. We suggest the following excerpt taken from a Missouri Department of Conservation publication entitled, "Changes in the Channel of the Lower Missouri River and Effects on Fish and Wildlife," be included in this section: "Many factors may effect the commercial catch in a body of water, but the one steady, consistent change in the Missouri River has been the reduction and deterioration of fish habitat resulting from the navigation and stabilization project."

The purpose of Section II of the EIS is to summarize the setting of the project area, not to infer "causes and effects" that produced the existing setting.

CURR'S UP ENGINEERS RESPONSES

Section IV, The Environmental Impacts of the Remaining Construction and Maintenance of the Bank Stabilization and Navigation Project

Page IV-1, paragraph 4.01

Rather than impacts, this listing actually presents the Corps activities which will ultimately result in impacts on the environment.

Page IV-1, paragraph 4.02

Effects, impacts, and consequences are used synonymously in the Council on Environmental Quality Guidelines. The definition presented in the above-referenced paragraph does not seem quite correct.

Page IV-2, paragraph 4.02.1.1

The fourth sentence would be more correct and meaningful if written as follows: "An adverse effect which is cumulatively significant is the continued loss of aquatic and semiaquatic habitat."

Page IV-2, paragraph 4.02.1.2

The alterations of the main channel bed is most certainly biologically significant. Alteration of the channel is what the project is all about. All adverse impacts associated with the project are a result of altering the channel. Adverse impacts include accretion of sediment between dikes, lowering of the riverbed in some areas which results in the drying up and eventual loss of important side channels and backwater areas, and channelization with associated impacts on the floodway such as decreasing the flood-carrying capacity.

Page IV-2, paragraph 4.02.1.3

A very significant adverse impact resulting from the continuing loss of quiet-water areas is the concentration of migratory waterfowl in a few remaining areas. This has created a potential for serious disease epidemics that could be devastating to the Central Flyway.

Page IV-2, paragraph 4.02.1.4

It seems more likely that the accumulation of sediment around the dikes would decrease the amount of water surface in the river rather than the amount of water. The amount of water is well regulated by releases from upstream reservoirs and tributary inflow.

Your comment is valid. Section IV has been modified to reflect your comment below where effects and impacts are used interchangeably, and are the consequences of the Corps and commercial barge actions.

Your comment is accepted, Section IV has been modified. See the response above.

The point of the first sentence, which your rewrite does not accommodate, is that continued maintenance of dikes and re-ventments (the proposed action) will have the adverse consequences of not permitting the river to leave its present channel, creating new (and presumably diverse) water areas.

This detailed statement is scoped to recognize the proposed action, not action that has taken place in the past. Paragraph 4.02.1.2 addresses the effect on the existing main channel, not the effects behind dikes, in chutes, or other areas of the river.

It is agreed that the potential for increasing the occurrence of density dependent disease among migrating waterfowl can be associated with concentration of waterfowl numbers through reduction of favorable resting habitat. However, based on the normal concentrations of fall migrating waterfowl at numerous state and Federal management areas and refuges without this effect being common seems to preclude this adverse effect from being recognized as very probable and, therefore, significant.

You are correct. The statement in paragraph 4.02.1.4 of the draft impact statement was intended to state the amount of water surface would be reduced rather than the amount of surface water would be reduced.

CORPS OF ENGINEERS RESPONSES

Can it be said with certainty that low elevation sills will not cause accretion of sediment? It appears that accretion results up to the elevation of the sill. Paragraph 1.03.3 states that sills are designed to control the shape of the river cross-section in order to maintain navigation depths in the desired portion within the section.

Page IV-3, paragraph 4.02.1.7

We question the contention that maintenance of the structures and channel configuration have both beneficial and adverse aesthetic effects depending upon one's point of view. There is no question that the majority of people would prefer natural river settings over artificial rock-lined channel. In our opinion the final statement would be more accurate. It aesthetic comparisons were placed in proper perspective. Other than this generality, Section IV is the most comprehensive and well written in the draft.

Page IV-3, paragraph 4.02.2.2

Snags are important habitat for fish and other aquatic organisms. Therefore, their removal does have significant adverse effects on aquatic organisms.

We suggest that the relationship between dredging activities and the sand and gravel industry (paragraph 4.02.2.2) merits additional discussion in paragraph 4.02.7.2. Specifically, we believe that the feasibility of recovering the sand from spoil dredged from the navigation channel should be considered. Of course, distance from markets or quality of the material to be dredged might preclude economical recovery of sand at some sites. At sites where recovery of sand from the channel is viable, however, dual benefits would accrue: a valuable mineral resource would be conserved, and the amount of spoil would be decreased, thus lessening the effects of disposal.

Page IV-3, paragraph 4.02.3.2

The areas between dikes are not the most diverse aquatic habitats. However, it is true that they are some of the more diverse areas left and are adversely affected by spoil disposal.

Page IV-4, paragraph 4.02.4.2

Another potential adverse impact of drifting barges results from spills should a loaded barge break up and sink. Spilled toxins and other harmful substances would degrade water quality, destroy aquatic and semiaquatic life, and impair downstream use. Admittedly, the probability

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Sills positioned below the water surface do affect sediment deposition; however, the repositioning of the sediment does not normally cause the amount of water surface to diminish as do dikes which can cause sediment deposition to the elevation of the water surface, thus reducing the amount of water surface.

17

Aesthetics as used in 4.02.1.7, considers humans' emotions, such as the river bank landowners' feeling of protection with rock-lined banks, and the naturalists' feelings of habitat lost by the same rocks, as well as the physical sensations of touch, sight, hearing, taste and smell.

18

Agree that river snags usually provide desirable habitat for river fish; see paragraph 4.02.1.8.

19

Commercially operated sand-sucking dredging activities have averaged two to three million tons of sand recovered from the river per year in recent years. Sites are selected for this type operation by type and particle size available in the river bottom. Normally, these dredges have some simple segregating facility on board and the water and fine material are returned directly to the river. Since maintenance dredging occurs on an emergency basis only, it would be difficult to give advance notice to contractors regarding the location, amount of material available, and when dredging would occur. Additionally, the Federal Government would be put in a position of competing with private industry as a supplier of construction materials.

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Noted

21

Agreed, paragraph 4.02.4.2 has been rewritten to reflect this effect.

of such an event occurring is low. In addition, there is a greater probability of fires occurring with higher volumes of river traffic.

Page IV-5, paragraph 4.02.6.4

Areas between dikes have potential as fish and wildlife habitat and associated recreation. These areas have high economic value.

Section V, Any Adverse Environmental Effects Which Cannot Be Avoided

Page V-1, paragraph 5.01

The NEPA requires a detailed statement by the responsible official on "any adverse environmental effects which cannot be avoided should the proposal be implemented." The superficial discussion in Section V is inadequate. Rather than dealing in simplistic statements such as, "the pristine setting of the Missouri River and its floodplain will not return . . .," this section should treat, in a realistic manner, the adverse effects which cannot be avoided. As a beginning, additional valuable shallow-water areas will be lost through sedimentation, and continued bottom degradation will deplete other productive areas. Both the rate and adverse effects of bottom degradation should be projected in specific terms including critical ecosystems that stand to be impacted. This is discussed in some degree in Section IV, 4.02.1, and Section II, 2.03.6.1. We do not agree with the claim in Section V that the channelized stream contains " . . . a diverse mixture of the same aquatic habitats it once contained." This is a distorted and misleading statement at best. The following description taken from the paper "Channelization and Its Effect on the Limnology of the Lower Missouri River" by John W. Robinson, Missouri Department of Conservation, gives a more accurate picture of the channelized stream:

Before channelization the Missouri River was very wide and contained many islands, associated side channels, and sloughs. It provided a diverse habitat which was productive of fish and game and ideally suited for recreation. The major effect of channelization obviously has been the destruction of diversity of fish and wildlife habitat. The construction of dikes, revetments, and closing structures has been the direct cause of the loss of habitat diversity and water area.

Paragraph 2.02.6.4 has been changed to reflect its intended direction to agricultural economics. Paragraph 4.02.7 has been altered to better express the adverse effects of dredging on recreation and wildlife habitat.

22

Section V has been expanded, but continues to state that the diversity of habitat types that existed before the Corps authorized program was initiated remain, but does state that the loss of shallow water habitat has been most significant. As stated in the Syllabus, this EIS addresses the proposed action (as required by NEPA, Section 102(2)(c)) and not the past action.

23

The alternative of terminating existing and future action by the Corps of Engineers has been rewritten. Commercial navigation would likely be substantially reduced and possibly eliminated because of deterioration of the channel dimensions. Agricultural benefits would be substantially reduced when bank erosion becomes widespread. This condition will be delayed because of the maintenance of the bank protection structures by individual and small groups of farmers, at least until abnormally high river stages occur or until fish and wildlife resources, in the long term could benefit through an increase of the more valuable habitat types indirectly caused by the reduction of bank stabilization. Recreation in and on the river is not wholly dependent upon the project structures, except as the bank stabilization structures preserve recreation facilities developed on the river banks. The kinds of recreational activities now occurring on the river would continue to occur if the project were to be discontinued. A more thorough treatment of possible modifications of project structure design to benefit the natural environment has been added to the text at paragraph 6.03.

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Section VI. Alternative Progress to the Missouri River Bank Stabilization-
Navigation Project

Page VI-1, paragraph 6.01

Without continuation of the project, navigation and agricultural benefits would be decreased. However, as this DEIS indicates, fish and wildlife resources, recreation, and floodway capacity would be increased. This DEIS should address this relationship in greater detail. Continuation of the project would be justified only if it is totally economically feasible.

The Study referred to makes a comparison of transportation costs for grain shipments from a 6-1/2 county area around Fort Dodge, Iowa, which is in the central part of the State, approximately mid-way between the Mississippi and Missouri waterways. It states Fort Dodge is about 200 miles from the Mississippi (Dubuque) and the destination was Gulf ports. The study would seem to suggest that, if unit train size shipments were available and loading facilities existed to accommodate such barge movements, the unit train would be the modal preference at a point 200 miles from the river. This study merely suggests the outer limits of the waterway market area, but does not address the total market sphere relevant to the waterway traffic demand. In any event, the rail transportation charges would probably be greater in the absence of water-compelled rates.

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Page VI-1, paragraph 6.01.1

A Federal study on moving grain out of the heavy-producing areas in Iowa indicates that unit trains provide more economical transportation than most combinations of trucks and river barges. The study was prepared for the U. S. Department of Transportation by Iowa State University Economist C. Phillip Baume, John Miller, and Thomas P. Drinka under a Federal contract with the Iowa Transportation Department.

Page VI-2, paragraph 6.02

The alternative section (Section VI) has been greatly expanded to provide additional information about possible effects on the fish and wildlife resources related to termination of the existing and future Federal action of completing construction of the project and maintenance of the project, and related to termination; just the navigation function of the authorized project.

26

Section VI stresses the loss of "economic benefits" and only briefly mentions the increased fish and wildlife habitat should the project be discontinued. Also, in the final statement, paragraph 6.02 of Section VI should present a more thorough treatment of possible modifications of project structure design to benefit the natural environment.

Section VII. The Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

Page VII-1, paragraph 7.01

This Section claims that adverse impacts on the area's terrestrial and aquatic flora and fauna will not "... forever impair the potential productivity of the area ...". However, in Section V, bottomland timber and riverine vegetation have been irretrievably reduced. This contradiction will need clarification in the final statement. We again protest the use of the language in Section VII, 7.01, "... recreational benefits of man ...", when referring to this project.

Section VIII. Irreversible and Irretrievable Commitments of Resources

Page VIII-1, paragraph 8.01

The statement that "... the pristine river with its abundant and varied aquatic habitats, its riverine vegetation, and its bottomland woods cannot be returned ..." is not entirely true and is even contradicted in this DEIS by paragraphs 2.05, 6.01.2, and 6.01.3. There does exist a great biological and physical potential for reestablishment and improvement of fish and wildlife habitat along the Missouri River.

Section IX. Coordination With Others

Page IX-1, paragraph 9.01 and 9.01.2

Coordinated efforts have centered on the dike-notching program rather than on dredging.

In conclusion, we believe the final statement should place more emphasis on your plans to "... promote efforts which will prevent or eliminate damage to the environment ..." - one of the major purposes of the NEPA - and less emphasis on project description and economic considerations.

Sincerely yours,

John E. Rayburn
for Special Assistant to the Secretary

CORPS OF ENGINEERS RESPONSES

The statement in the final impact statement has been modified to explain that certain indirect effects of the proposed Corps actions will contribute to the irretrievable loss of river-fringe woodlands, and that such an adverse effect is considered by some people to be a curtailment of productivity. See response # 3 for further explanation.

The scenario of Section VIII used "riverine" as referring to volunteer, native vegetation from the river through the first terrace, with woodland making up part of the remaining bottomland. The bottomland now supports an agricultural industry that is much different from the agricultural industry of the years before project construction. Today's industry supports and, in turn, is supported by agricultural commodity manufacturing industries (farm equipment, ag chemicals, irrigation material, etc.). These forces, together with consumer farm products, would support the continuation of farming the bottomlands generally as now being practiced to the river's edge. The Missouri River ecosystem (aquatic and bottomland) of the years before project construction is, in our judgment, irretrievable. As stated in the paragraphs identified some aspects of the ecosystem are reversible, but not the total ecosystem as it existed before the project.

In an effort to coordinate criteria for dredge spoil placement an Interagency Task Force on Dredge Spoil Disposal Alternatives was formed in 1975 with representatives of the Corps of Engineers, Environmental Protection Agency, U. S. Fish and Wildlife Service, Missouri Department of Conservation, and Kansas Forestry, Fish and Game Commission. The Task Force met in the Kansas City office of the Corps on 7 April, 22 May, and 9 September 1975.

The Corps of Engineers shares your belief that the prevention or elimination of damage to the environment should be a major component of our remaining construction and ongoing maintenance of the bank stabilization and navigation project. Our on-going study of fish and wildlife mitigation, our on-going environmental notch program, and our continuing efforts to determine dredge spoil sites that will have the least adverse effects on the environment, we feel, attest to our commitment.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
1725 BATTIMORE - ROOM 349
KANSAS CITY, MISSOURI 64106

July 15, 1976

Brigadier General William E. Read, USA
Division Engineer
Missouri River Division
U.S. Army Corps of Engineers
P.O. Box 103
Omaha, Nebraska 68101

Dear General Read:

Continuing Construction and Operation and Maintenance,
Missouri River Bank Stabilization and Navigation Project

The Region VII Office of the Environmental Protection Agency has reviewed the Draft Environmental Statement for the project identified above. The project and statement have been rated EB-3 (environmental reservations-inadequate), respectively. This rating means our agency has environmental reservations with the project as proposed. Our primary concerns are the continued project related losses of riverine and riparian habitat with a corresponding reduction in fish and wildlife resources, degraded water quality, and reduced flood carrying capacity in the Missouri River. We are also concerned with the additive impacts the continuance of the project will have on other portions of the inland waterways system.

CORPS OF ENGINEERS RESPONSES

GENERAL RESPONSE

The syllabus statement contained in the EIS is the position of the Corps of Engineers, Missouri River Division, in addressing the Missouri River Bank Stabilization and Navigation Project. The following outlines the basis for this position.

A programmatic EIS is not required because the project, while hydrologically related with the main stem dam, is an independent project and as such an EIS covering this project is sufficient within the terms of NEPA. Its independence is derived from the showing that (1) it was funded separately, (2) it was authorized separately in that a viable, Congressionally authorized navigation project existed on the lower river before the main stem dam system was constructed, and (3) it requires no irrevocable commitment of resources beyond the boundary of the project. The statement is, however, a "programmatic" statement in that it covers the individual work items necessary to complete and maintain the authorized project, such as repair of dikes and revetments and intermittent dredging, and provides the new dikes and revetments needed to complete the project. Even if a programmatic EIS were required, it would be necessary to limit the EIS to this project by the practical necessity, or the rule of reason, because it is unreasonable if not impossible to identify and adequately address all secondary and interrelated social, environmental and economic effects of the being of this inland waterway on other inland waterways, other Missouri River Basin water resource projects, and other river basin water resource projects. And, in this regard, we also recognize that there will be the issuance of regulatory permits, whose direct environmental impacts would be upon the lower Missouri River. Regulatory permit actions are unscheduled and occur year-in and year-out; therefore, it would be impossible to predict specific locations or kinds of actions which will be requested, and which would significantly affect the environment. To the extent that the other projects are major Federal actions which would significantly affect the human environment, they have been or are being the central subject of separate impact statements.

Additionally, the current operations and maintenance of the main stem system conducted by the Corps (exclude water marketing currently handled by the Bureau of Reclamation) does not significantly alter the post reservoir system average annual flow of the Missouri River and further we see no increased effect on commerce on other inland waterways by the completion of the navigation project and its continued maintenance.

CORPS OF ENGINEERS RESPONSES

It is the opinion of the Missouri River Division, the preparer of the impact statement, that the significant consequences of the remaining construction and on-going maintenance of the project have been adequately presented in this document, and that the reasonable alternatives have been recognized in the sense of probable consequences of the alternative actions on the project area. It has been shown that the construction effort is more than 90 percent complete, and that the economic justification of remaining construction is more than adequate with a benefit-cost ratio at 6-5/8 percent interest of 1.4. Congress has reviewed annually the costs, benefits, and construction funding requests. It has further been displayed that significant acreage of highly productive agricultural land has been preserved and protected while a navigation channel has been created. These efforts have created many benefits to the users of the project outputs and to the economy of the Basin. Continued operation of the project will allow these benefits to continue, ever increasing as agricultural productivity rises and water transportation continues its recent trend of growth.

The final impact statement does represent a revision of the draft statement in response to the comments of the reviewers to the extent that the Missouri River Division concurs with the rationale and the additional information offered.

The draft statement has been rated inadequate since it did not adequately assess the significant environmental impacts of the ongoing construction, operation, and maintenance program for the Missouri River Bank Stabilization/Navigation System nor did it adequately assess the need to continue and complete the existing system. In addition, the statement did not include a comparative environmental, economic, and resource evaluation of reasonable project alternatives.

The enclosed comments address our concerns with both the project and statement in greater detail. We suggest substantial revision of the draft statement be made to enable this agency and the general public to fully evaluate the effect(s) of the continuation and completion of the project as well as reasonable alternatives to the proposed action.

We appreciate the opportunity to review this draft statement. Please forward five copies of the final statement to our office when it is submitted to the Council on Environmental Quality. My staff is available to discuss our concerns and aid in their resolution.

Sincerely yours,

Jerome H. Svore
Jerome H. Svore
Regional Administrator

1. INTRODUCTION AND CONCLUSIONS

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Statement for the Continuing Construction and Operation and Maintenance, Missouri River Bank Stabilization and Navigation Project. The proposed action entails the continuing construction and maintenance of river training devices from Sioux City, Iowa downstream to the confluence of the Missouri and Mississippi Rivers.

This agency has reservations with the project as proposed. These reservations are based on the expected adverse environmental impacts of the project and the effect these adverse impacts may have on the entire Missouri River system. The bases for our environmental reservations are explained in greater detail in part II of the comment letter.

The predicted adverse consequences of completing the project, its use and of continuing the maintenance of the project are minimal compared to the economic and social benefits derived from continuation of the authorized functions of the project.

CORPS OF ENGINEERS RESPONSES

The draft statement is also totally inadequate. The environmental impacts we believe should have been addressed in the document are given in part III of the letter.

The final statement identifies all of the impacts of substance of the proposed action of completing construction of the project, of maintenance of the project and/or the commercial barge use of the navigation channel.

We believe our reservations with the project are highly significant and our request for additional project related information is reasonable. Therefore, we suggest action on the proposed project be deferred until our concerns are satisfactorily resolved.

We cannot concur with the suggestion to hold the project in abeyance pending a programmatic EIS since the reach between Sioux City and the mouth is presently being navigated its entire length and 90% of the stabilization structures are in place and accomplishing design function. To discontinue construction and maintenance would be more damaging to the presently existing environment. See paragraph 6.02.

Corps actions in 1977 relative to the project were preceded by public notice and consultation with EPA and other State and Federal agencies which possess jurisdiction over various actions which occur within the project reach of the river.

II. ENVIRONMENTAL RESERVATIONS

In conducting our evaluation of the proposed action, we have considered the effects to the environment on the entire Missouri River including the reach from Sioux City, Iowa to Fort Peck Dam, Montana. We have included the main stem reservoirs in our review because lower Missouri River navigation could not exist without these reservoirs to stabilize the river flow. We also considered, although to a lesser degree, those tributary reservoirs which augment Missouri River navigation flows as well as those portions of the inland waterways system which directly complement Missouri River navigation. Since the draft statement has not provided an adequate evaluation of the major impacts, we have based many of our reservations with the project on information contained in other Corps documents as well as previous EPA concerns with other segments of the inland waterways system.

EPA evaluation of the draft statement is much broader in scope than the text of the statement written by the Missouri River Division.

To the extent that the impacts described are the result of river training devices and dredge spoil disposal, these impacts have occurred as the result of actions taken over the past 40 years. The subject of the current impact statement is the limited amount of remaining construction of dikes and revetments necessary to complete the project and the on-going maintenance of the project. These actions are being carried out subject to newly involved measures that have the objective of not significantly reducing the presently existing water surface areas of the river in the project reach. These measures include reduced height criteria for channel structures, the dike notching program, disposal of any dredged spoil within the main river channel, and continuous evaluation of the river in its environmental setting with the aim of evolving further ameliorative measures. The measures are discussed in paragraphs 1.08.8, 1.10.3, 1.10.4, 1.10.5, 4.02.1.4, 4.02.1.6, and 4.02.7. The avoidance of channel dredging continues to be a design objective; however, alternative measures are carefully designed to minimize any further contraction of the main river channel and any loss of water areas behind dike systems. A limited number of underwater sills, described in paragraphs 1.08.3 and 4.02.1.4, will be used if necessary to correct local navigation channel deficiencies. Further reduction of aquatic and riparian habitat directly caused by the remaining construction and on-going maintenance of the project is expected to be minimal.

Further reduction of aquatic and riparian habitat directly caused by the remaining construction and on-going maintenance of the project is expected to be minimal.

7

A. Riverline and Riparian Habitat

1. The statement identifies reduction of aquatic and riparian habitat as adverse environmental effects. Further elaboration of these impacts is warranted. The water surface area of the Missouri River between Rulo, Nebraska and the mouth has been reduced 50 percent in the period between 1879 and 1972 in order to construct a nine-foot navigation channel (Funt and Robinson, *Changes in The Channel Of The Lower Missouri River And Effects On Fish And Wildlife*, Missouri Department of Conservation, Aquatic Series No. 11, 1974). Chutes, sloughs, islands, snags, riparian timber, and wetlands have practically been eliminated. Similar impacts have undoubtedly occurred to the reach between Rulo, Nebraska and Sioux City, Iowa. These impacts occur as a result of river training devices and dredge spoil disposal. We have reservations with the continued commitment to incur these impacts. In addition, the draft statement, page 1-5 states, "The avoidance of dredging continues to be a design objective". We have reservations with this design objective since, in the furtherance of navigation, additional constriction of the Missouri River with its concomitant wetlands loss appears to be the only alternative to dredging.

IX-21

2. We also have reservations with potential wetlands destruction arising from the newly proposed erosion control demonstration program from Garrison Dam to Lake Oahe, North Dakota and from Fort Randall Dam, South Dakota to Sioux City, Iowa. This program is in response to releases of relatively clear water from the main stem Missouri River reservoirs which cause excessive river bank erosion. We are concerned the erosion control program could, if initiated, result in significant losses of wetlands.

8

The erosion control demonstration program, constructed under the authority of Section 32 of PL 93-251, lies entirely upstream from Sioux City, Iowa. It is outside the geographic scope of the present statement and is independent since the Section 32 actions will have no significant impacts on the navigation and bank stabilization reach of the Missouri River.

3. Since continuation of Missouri River navigation is dependent on other segments of the Mississippi River Inland Waterways System, we are also concerned with the additive environmental impacts continuing Missouri River navigation has on other segments of the navigation system. For this reason, we are concerned with the proposed action. This concern is based on our review of the Corps' final impact statements, Mississippi River Between the Ohio and Missouri Rivers Regulating Works (April 1976) and the Mississippi River and Tributaries, Mississippi River Levees and Channel Improvement (February 1976). The first document indicates approximately a 25 percent reduction in the remaining surface area of the river and elimination of the remaining chutes and backwater areas will occur in the middle Mississippi River due to navigation. The second document indicates 23 percent of the remaining chute habitat and 22 percent of the remaining backwater habitat will be lost in the lower Mississippi River due to navigation. Continuation of navigation on the Missouri River requires attributing some of the losses identified above to the bank stabilization/navigation project.

B. Fisheries Deterioration

Page 11-12 of the draft statement indicates the economic pursuit of fishing in the Missouri River has decreased in importance over the last 30 years. Some of the factors resulting in decreased fishing are directly related to the bank stabilization/navigation project. These factors include reduced habitat and food organisms, increased river velocities, sedimentation, riverbed degradation and wetland drainage. We have reservations with the perpetuation and possible exacerbation of this severe impact.

C. Water Quality Degradation

We have reservations with the project because of both the introduction of pollutants to the river as a result of navigation associated activities as well as secondary pollution sources. We disagree with the conclusion of the draft statement which suggests dredging does not and is not expected to degrade water quality (pages IV-3 and IV-4). Information contained in the Corps' final environmental statements for Missouri River Levee Units R-616 and L-611-614 indicates channel sediments contain concentrations of heavy metals and pesticides which we believe may exceed safe levels for aquatic life. The disposal of sediments between wing dikes can seriously affect the already reduced aquatic fauna of the river through both physical and chemical water quality degradation. We also have reservations with the potential introduction of pollutants from navigation related activities such as pumping of bilges, accidental spilling of cargo and sinking of vessels. In addition, we are concerned with pollution from domestic sewage and industrial effluents resulting from secondary development related to the bank stabilization/navigation project. The continuation of these known and potential water quality effects, especially in light of possible water shortages in the future, must be viewed with reservations by this agency.

Continuation of navigation traffic on the Missouri River has minimal impact on the Mississippi River system either upstream or downstream from the mouth of the Missouri. In 1975 the navigation tonnage entering and leaving the mouth of the Missouri River was only 3.2 percent of the tonnage on the Mississippi River from the mouth of the Missouri to the mouth of the Ohio River. The traffic generated in the Missouri River project, therefore, has only a relatively minor secondary impact on the physical scope of navigation channel works and other navigation structures on the Mississippi. The Mississippi River project and its environmental impacts would be essentially the same with or without the Missouri River project.

The presentation on commercial fishing has been modified (see Section II) to reflect certain findings presented in the Missouri River Basin Comprehensive Framework Study, conducted by the Missouri Basin Inter-Agency Committee. It can be noted from review of this information and more recent material printed in the text that there has not been a significant and lasting reduction in the annual commercial fish production in the project reach of the river since construction of the presently authorized project began. Undoubtedly, the development of the project, particularly as it influenced the reduction of quiet, shallow water area, contributed to the present and recent past commercial fish production picture. The species composition of the river population which apparently changed dramatically in the late 1800's and early 1900's had its influence on the annual commercial fish production as well. The Missouri River Division does not believe, based on data available, that the remaining construction or continuing maintenance of river structures will influence in any way the current and recent past commercial fish production on the Missouri River.

Dredging typically removes the most recent depositions on the bed of the main channel. It would normally remove material that was not present at that location during the previous navigation season. In this sense, accumulated potential pollutants of some tenure, remote from the river water-river bed interface, would not be disturbed and re-introduced into the river's water mass. Paragraph 4.02.2.2 has been revised to present the results of sampling by the Environmental Protection Agency and the Corps of Engineers during emergency dredging operations on the Missouri River in 1974. Dredging or any other aspect of the Federal work requirements of the project cannot influence the use of potential pollutants such as heavy metals and pesticides. The potential for accidental spilling of cargo which would introduce pollutants into the river certainly exists; however, this has not happened to date. It is assumed that sewage and industrial effluents which come from secondary developments related to the project would be contained to insignificant levels through the enforcement authority of PL 92-500.

D. Flood Carrying Capacity

Previous constriction of the river for navigation has increased the flood crest stages of the Missouri River. Although this impact is acknowledged in the draft statement, an assessment of the significance of this impact is completely absent. We have reservations with the continuation of existing flood stages along the river and the potential for further increases in flood stages as a result of this proposed action. Furthermore, we have reservations with the project due to the adverse impacts of increased flood stages on the human environment. We are also concerned with the effects of providing new flood protection projects which have their own adverse environmental impacts.

12

III. STATEMENT INADEQUACIES

Due to the magnitude of the Federal government's investment in this continuing project and the concomitant environmental impacts which have historically occurred, the impact statement should be as thorough and objective an evaluation of the project as possible. The failure of the draft statement to assess significant environmental impacts, to address the need for continuing and completing the current project, to adequately analyze reasonable alternatives, and to provide documentation within the text to support general conclusions makes it impossible to assess the environmental impacts of the project. For these reasons, we consider the draft statement inadequate.

13

The impact statement does not appear to be in compliance with the intent of the National Environmental Policy Act of 1969, the Council on Environmental Quality's guidelines for preparation of environmental impact statements (E.R. Vol. 38, No. 147), or the Corps' own guidelines for impact statement development (E.R. Vol. 39, No. 68). The following are specific statement inadequacies. We believe these issues must be considered by the Corps in a manner pursuant to compliance with the aforementioned environmental impact statement development guidance. This information is essential to properly address the trade-offs necessary to allow a reasonable decision whether to continue and complete the project as currently envisioned, terminate some or all of the project features, or significantly modify the current project design and operation.

14

It is the judgement of the Corps of Engineers, Missouri River Division, that the proposed action (remaining construction and project maintenance) will not significantly increase the present flood crest stages. Elevation criteria have been adopted for the remaining construction and for ongoing maintenance of structures that are designed to avoid future increases and possibly reduce present effects on stages.

The impact statement addresses those environmental impacts which we consider significant in a manner we consider objective. The discussion about alternatives has been greatly expanded in the final impact statement.

The statement is in compliance with NEPA and CEQ's guidelines. To this effect see General Response concerning programmatic EIS. An interpretation of our regulations would require that O&M projects, if necessary, be the subject of separate EIS or we may write a composite EIS for several similar O&M projects such as flood control reservoirs, which we have done for the main stem dams. Therefore, an EIS covering the completion of the navigation project and its continued maintenance alone is within our regulation.

CORPS OF ENGINEERS RESPONSES

It is explained in paragraph 1.10.5 that the intermittent nature of dredging requirements allows susceptible location to be identified only in a general way and make it impracticable to predict from year to year at what locations dredging might be needed, or whether dredging would be required at all. Details of Missouri River water quality and sediment data have been added to the text at paragraph 4.02.2.2. The Corps has on file the results of laboratory analysis, laboratory numbers 060098 and 060107, of samples obtained by EPA Region VII on 21 and 28 August 1974, from discharge pipe effluent's during Corps of Engineers dredging operations at Missouri River miles 279.3 and 365.0. The results showed the concentrations of heavy metals, nutrients, and pesticides to be below pollution levels. Also on file are samples of suspended solids concentrations obtained by the Corps on 20 August 1974 at various distances downstream from emergency dredging operations at river mile 279.3. The results show that any significant increases in concentrations disappeared after one-quarter mile downstream from the dredging site.

15

See paragraph 4.02.3. It appears that EPA has adequate control of all disposal site selections under present methods of consultation and operations.

16

All specific locations are not known at this time; however, new construction requiring placement of rock (recognized as pollutant in PL 92-500) and other construction material which are considered pollutants is evaluated and public notices issued thereon (para. 1.10.5.) The estimate of ultimate traffic of 5 million tons made in the report "Missouri River Channel Stabilization and Navigation Project, Sioux City to Mouth," Appendix III, 28 July 1950, remains current (para. 2.04.5.6). The traffic increase to 5 million tons would not have a substantial impact on the environment.

17

A. Water and Sediment Quality Data

The draft statement did not provide Missouri River water and sediment quality data. In order to assess the impact of dredging, the final statement should identify the location of sites which require recurrent dredging and indicate the quality of river water and sediment at those sites. If river water and sediment quality data are unavailable, we question Section 4.02.2.2 of the draft statement which states in part, "...release of the chemical substances into the river water during dredging operations is not significant."

B. Dredge Spoil Disposal Sites

Page 1-5 of the draft statement acknowledged that, "In the future, designation of dredge spoil disposal sites will be in accordance with EPA guidelines in accordance with Public Law 92-500". However, the statement did not provide an assessment pursuant to EPA's Section 404 guidelines. The impact statement is the appropriate vehicle for identifying and reviewing the site specific impacts associated with each disposal site. Therefore, we request this information be supplied in the final statement in order that we may review the disposal sites in detail pursuant to our responsibilities under Section 404 of Public Law 92-500.

C. Remaining Construction

The project, as authorized, is approximately 90 percent complete. However, the draft statement did not identify or assess the impacts associated with the remaining 10 percent of the project to be constructed. Pursuant to our responsibilities under Section 404 of Public Law 92-500, we request detailed, specific site identification of remaining work to be accomplished along with an assessment of the work pursuant to our Section 404 guidelines. The final statement should discuss potential increases in barge traffic with the concomitant environmental effects which are anticipated with project completion.

CORPS OF ENGINEERS RESPONSES

D. River Hydraulics

The draft statement did not assess the effects of increased flood stages on the Missouri River. Since higher stages will continue to result from the construction, operation and maintenance of the navigation system, the adverse environmental and economic effects, causing a need for additional flood related expenditures, should be assessed in the final statement. This assessment should include damages to levees, etc., from the ice jams formed by river training devices. The degree to which increased stages on the Missouri River contribute to documented increases in Mississippi River flood stages should also be assessed.

18

Discussion has been added to the text of paragraphs 4.02.1.4 and 4.02.1.6 to assess the effects of increased flood stages on the Missouri River. The small amount of construction remaining to be completed and the on-going operation and maintenance of the project are not expected to cause stage increases over what might already have occurred. There has been no evidence that training devices have caused ice jams in the Missouri River; in fact, the reverse might be true due to the regularization of the channel alignment. A re-evaluation of the flow line is being made by the Corps for the Mississippi River, and a similar study is beginning for the Missouri River. However, no evidence exists that these conditions are being induced by one river on the other.

The final statement should be expanded to include an assessment of the degrading Missouri riverbed. The degrading riverbed is causing the drainage of chutes, backwater areas, flood plain wetlands and oxbow lakes. We believe a complete qualitative and quantitative evaluation of this impact on riverine wetlands by the navigation system should be made since these are the only areas which can be preserved or developed to somewhat mitigate the past destruction of riverine habitat.

19

This statement has been expanded at paragraphs 2.02.1.3 and 2.03.6.1 to describe the degradation trend and to assess its impacts on cut-off lakes, chutes and backwater areas adjacent to the channel. There is currently underway a study of degradation on the Missouri. Needs for mitigation and any other actions will emanate from that study.

E. Cumulative System Evaluation

The draft statement inadequately assesses the cumulative impacts of navigation on the Missouri River. The discussion of operating the main stem reservoirs should be expanded. Specifically, the environmental and economic benefits and costs associated with their continued operation to support navigation should be included in the final statement. A key issue which is beginning to surface with regard to these reservoirs is the long-term maintenance of nine-month navigation flows in the lower river. Should additional water be diverted from the main stem reservoirs for increased consumptive uses, such as irrigation and energy development, serious economic and environmental impacts could arise in the lower basin. The final statement should also address long-term uses of the Missouri River Basin water in a manner which the alternative uses can be assessed.

20

Section II has been expanded to provide significantly more information about water releases from the main stem reservoir system. The information includes the influence termination of the navigation function would have on altering the current release pattern as well as the influence upstream depletion would have on altering the reservoir system releases.

CORPS OF ENGINEERS RESPONSES

The Missouri River tributary reservoirs which are designed and/or operated to augment navigation flows should be identified. The major impacts to these reservoirs, such as drawdowns, as a result of providing navigation flows should be summarized and assessed in the final statement.

The draft statement did not relate the project to other actions currently under consideration by the Corps. For example, an assessment of the recently proposed erosion control demonstration program from Garrison Dam to Lake Oahe, North Dakota and Randall Dam, South Dakota to Sioux City, Iowa was not presented. An evaluation of this and other proposed actions which may affect the Missouri River and/or navigation should be provided and related to the bank stabilization/navigation project.

We understand there is a preliminary study underway to extend navigation to the upper reaches of the Missouri River. This proposal could include up to 16 locks and dams on the reach of the river from Sioux City, Iowa to just above Garrison Dam, North Dakota. The final statement should relate the extension proposal to navigation on the lower Missouri River and assess the expected impacts of its implementation.

F. Secondary Impacts

The final statement should provide additional information concerning increased intensive uses of flood plain lands in the lower basin. Specifically, the magnitude and significance of clearing bottom land forests, filling of wetlands, and industrial/municipal encroachment should be assessed both quantitatively and qualitatively. In view of the increased flood crests associated with the continuance of navigation, a flood hazard evaluation pursuant to Executive Order 11296 is warranted. In addition, the role of the Corps' Section 10 and Section 404 permit programs should be included. We are concerned the issuance of private permits could act as stimuli to intensive flood plain development.

We are also concerned with levee units such as R-616 which are being justified on agricultural benefits with the full awareness of the Corps that industry will eventually become the dominant activity in the newly protected areas. The final statement should elaborate on these Corps permit and flood control functions and relate these activities to the bank stabilization/navigation project. In this regard we are also extremely concerned that these actions, which can stimulate flood plain development, do not adequately consider possible conflicts with areawide water quality management plans as required by Section 208 of Public Law 92-500 and the policy of the Flood Disaster Protection Act of 1973.

The subject of the impact statement is the remaining construction and maintenance of the bank erosion and navigation project; see General Response to the initial statement of your (EPA) letter of comment.

The actions that, in our opinion, relate to the Missouri River Navigation and Bank Stabilization Project have been identified. The erosion control demonstration program, authorized by Section 32 of PL 93-251, is being constructed in reaches of the Missouri River that are entirely upstream and outside the geographic scope of this statement. The Section 32 actions are independent and will have no significant impacts on the Navigation and Bank Stabilization reach of the Missouri River.

This alternative was considered in the "Review Report for Water Resources Development, Missouri River, South Dakota, Nebraska, North Dakota, and Montana." The report concludes all navigation extension alternatives display annual costs significantly in excess of annual benefits. Thus, the extension of Missouri River navigation is not recommended.

The Corps' role in both Sec. 10 and Sec. 404 permit programs is adequately detailed in the Federal Register of 19 July 1977. Our role in these programs has been further publicized in four separate public hearings across the country and by numerous press releases and public notices. The Corps is charged with making an in-depth review of each permit request and issuing permits for only those structures which are determined to be in the public interest. EPA is equally interested in protecting the best interests of the public which appears to be the basis for Public Law 92-500. EPA will continue to be furnished copies of Public Notices covering requests for permits for construction activities or dredge and fill activities below ordinary high water line and adjacent wetlands. It is expected EPA's review and comment on the proposed activities in the flood plain will express their concerns to each specific site as well as the cumulative effects of the development. The permit process provides adequate safeguards to protect the public interest in flood plain development.

6. Project Alternatives

The assessment of alternatives in the draft statement is inadequate. Two of the alternatives considered in the statement are termination of the whole project and termination of the navigation part of the project. The effects of these alternatives need to be fully explained to be meaningful in the decision making process. The final statement should include a comparative evaluation, in both qualitative and quantitative terms, of the economic and environmental impacts of terminating all or part of the existing project.

We also request the alternatives of modifying the existing project structure design and the utilization of shallow draft towboats and barges receive additional assessment. We suggest the same key factors be assessed for these modification alternatives as for the project termination alternatives. These modification alternatives may be necessary in the future due to decreased river flows caused by increased water consumption in the upper basin.

H. Alternative Modes of Transportation

The draft statement did not adequately address alternative modes of transportation to navigation. Relevant data identifying the energy efficiencies and cost effectiveness of other modes should be assessed in the final statement. We are particularly concerned about assumptions related to rail transportation. Rail transportation may be more energy efficient than navigation when considering:

1. Shorter distance between origins/destinations.
2. Use of unit trains.
3. The energy penalty paid when switching cargoes from barges to other modes of transportation or vice versa, and
4. The energy costs committed to the maintenance of the navigation system.

We believe an in-depth energy/economic/environmental analysis of alternative modes of transportation should be included in the overall decision to continue maintaining navigation on the Missouri River and for baseline data necessary to thoroughly assess any extension of the system north of Sioux City, Iowa.

CORPS OF ENGINEERS RESPONSES

The discussion of the alteration of termination of the navigation function and the alternative to terminate all of the Corps of Engineers actions to complete the authorized project including its continued maintenance has been expanded. See Section VI.

The discussion of modification of structure design has been expanded in paragraph 6.03. The discussion explains that these modifications are not true alternatives to the proposed action but rather are efforts, now that the alignment of the channel and river banks has been fixed, that may be employed to retain the desired river configuration with less construction material and with reduced continuing impact of the environmental setting. The environmental notch program is an example of this effort -- notched structures require less rock than structures without notches while they also improve, for biological purposes, the environmental setting. Changes in drafts of towboats and barges is discussed in paragraph 6.04. It's stated that this approach, as a practical matter, was demonstrated during the early years of the project when loading of about seven feet were necessary because the authorized channel depth had not been attained. A sustained limitation of 7 feet or less would be economically infeasible for the operations. Section II contains a subsection about navigation with relation to reduced water supply by upstream depletions; you are referred to paragraph 2.05 for a presentation of this information.

The 1973 Iowa State University study done for the Federal Railroad Administration estimated the fuel per ton/mile was about 50 percent greater for rail than for barge transportation. Generally, barge traffic is only utilized where goods are low in value, high in volume, time is not critical and shipping and receiving points are amenable to the waterway system. Use of unit trains involves the establishment of subterminals for marshalling materials in great enough quantities which might be equated with the additional handling entailed by barge shipment. The energy costs committed to the maintenance of the navigation system are included in the cost of operation and maintenance. Without water compelled rates, the cost of rail transportation in certain areas would likely increase.

COMPS OF ENGINEERS RESPONSES

Bank stabilization and navigation project features are very much interrelated. Bank stabilization minimizes sediment deposition in the channel where it becomes a navigational hazard. Navigation training dikes deflect potentially eroding streamflow away from the banks. While it is possible to separate project costs by reach, it is extremely difficult to differentiate structure costs by project purpose for many structures due to their dual function of bank stabilization and erosion control. Similarly, bank stabilization benefits are difficult to identify by reach. Sediment eroded from the banks in one segment of the river could eventually become a navigation hazard in another downstream area. The purpose of this environmental statement is to address the impacts which may be associated with completion of bank stabilization and navigation structures and recreation facilities of this project, as well as continuation of the present maintenance. The baseline condition for assessing the environmental impacts of the proposed Corps action (the subject of this EIS) is the present condition.

28

I. Benefit/Cost Analysis

The discussion of project benefits and costs should be expanded. Specifically, a breakdown of benefits and costs should be provided for each project purpose. We also suggest those benefits and costs be identified for each major segment of river (i.e., St. Louis to Kansas City, Kansas City to Omaha, Omaha to Sioux City). The final statement should also quantify those costs not specifically identified in the B/C ratio provided in the draft statement. For instance, the costs of increased flood damages and increased expenditures for flood control, past and future losses of recreational values as well as costs associated with main stem and tributary reservoirs should be included. We believe the proper baseline from which to identify these losses is the starting point of concerted activity to develop a nine-foot navigation channel.

IX-28

Since the project requires additional construction, the final statement should also discuss the economic benefits and costs associated with project completion along with the previously requested assessment of environmental impacts.

29

J. Supporting Documentation

Reference data supporting the conclusive statements or subjective opinions made in the draft statement are not provided in the document. While an extensive bibliography was provided in the draft statement, it was never referred to. This statement inadequacy should be resolved in a manner which allows the expeditious location of supporting documentation.

30

Sources of information used in writing the impact statement are listed, and the basic content of the more important material is also included. There was no attempt to reference supportive documentation in the way normal to scientific reporting. The final statement remains as the draft was written in this respect. It is the Missouri River Division's opinion that the quality of the final statement would not have been enhanced in proportion to the amount of time and money necessary to prepare it as a scientific report.

Construction of the project is more than 90 percent complete. After FY 1978 the remaining annual benefits and costs result in a B/C ratio of 1.6 to 1 at the authorized interest rate (2-1/2%) and 1.4 to 1 at the present interest rate of 6-5/8 percent.

CORPS OF ENGINEERS RESPONSES

IV. RECOMMENDATIONS

We recommend the continued construction of the bank stabilization/navigation project be held in abeyance until a comprehensive evaluation of its environmental effects on the entire Missouri River system is completed. This evaluation should include those portions of the Mississippi River system which directly affect or are affected by the Missouri River.

In addition, we recommend each project alternative identified in the draft statement, as well as the alternative to continue and complete the project, be assessed in accordance with Principles and Standards for Planning Water and Related Land Resources as established by the Water Resources Council.

31 You are referred to our response to a similar comment made earlier under your "I. Introduction And Conclusions."

32 Each viable alternative and the authorized plan have generally been viewed in accordance with the P&S for purposes of preparing this Environmental Impact Statement. Obviously, this view must rely more in assessment of impacts in the system of accounts. It is impracticable - and impossible - to evaluate alternatives in a pre-project sense for plan formulation purposes. After all, this project was authorized in 1945, construction started shortly thereafter, and the project pre-dates P&S by many decades.

FEDERAL POWER COMMISSION
WASHINGTON, D.C. 20426

IN REPLY REFER TO

CORPS OF ENGINEERS RESPONSES

JUN 1 1976

Colonel Harry F. Muma
Division Engineer, Corps of Engineers
Department of the Army
P.O. Box 103, Downtown Station
Omaha, Nebraska 68101

Reference: MEDPD-ER

Dear Colonel Muma:

This is in reply to Planning Division Chief Karabatsos' letter of May 6, 1976, addressed to former Chairman Nassikas, requesting comments of the Federal Power Commission on the draft environmental statement for the Missouri River Bank Stabilization and Navigation Project from Sioux City, Iowa, to the mouth of the Missouri River, a distance of about 735 river miles. The proposed action would involve completion of the construction of bank stabilization and navigation structures and continuation of the present method of maintenance of the project.

These comments of the Federal Power Commission's Bureau of Power are made in accordance with the National Environmental Policy Act of 1969 and the August 1, 1973, Guidelines of the Council on Environmental Quality. Our principal concern with projects affecting land and water resources is the possible effect of such projects on bulk electric power facilities, including potential hydroelectric developments, and on natural gas pipeline facilities.

Review by the Commission staff indicates that there are a number of steam-electric power plants along this reach of the Missouri River. The cooling water facilities of these plants utilize the Missouri River as the source of cooling water supply. The staff notes that there are numerous electric power transmission lines and natural gas pipelines which cross the Missouri River. Apparently there would be no conflicts in the operation and maintenance of these facilities with the continuing construction, operation and maintenance of the bank stabilization and navigation project.

The opportunity to comment on the draft environmental statement is appreciated.

Very truly yours,



M. Ridgway
M. Ridgway
Chief, Bureau of Power

Your comment is acknowledged.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
11177 West 8th Avenue
P.O. Box 25127
Lakewood, Colorado 80225

CORPS OF ENGINEERS RESPONSES


8410
June 15, 1976



Colonel Harry F. Muma, Division Engineer
U. S. Army Engineer Division, Missouri River,
Omaha, Nebraska
P. O. Box 103, Downtown Station
Omaha, Nebraska 68101

Dear Col. Muma:

Thank you for the opportunity to review the Draft
Environmental Statement for the Missouri River Bank
Stabilization-Navigation Project. We have no comments.


DAVE RITTERSBACHER
Director, Multiple Use and
Environmental Quality Coordination

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

Box 600, Salina, Kansas 67401

CORPS OF ENGINEERS RESPONSES

June 3, 1976

Mr. Gus J. Karabatsos
Chief, Planning Division
Missouri River Division
Corps of Engineers
Department of the Army
P. O. Box 103
Omaha, Nebraska 68101

Dear Mr. Karabatsos:

The Draft Environmental Statement for the Missouri River Bank
Stabilization - Navigation Project addressed to the Soil Conservation
Service has been reviewed.

We believe the statement adequately fulfills the requirements of
Public Law 91-190.

We have no comments regarding this statement and appreciate the
opportunity to review this draft document.

Sincerely,


Robert E. Wright
State Conservationist

cc:
Dr. Fadden G. Maxwell, Coordinator of Environmental Activities,
Office of the Secretary, USDA, Washington, D. C.
R. M. Davis, Administrator, SCS, Washington, D. C.
Council on Environmental Quality - 5 copies

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

823 Federal Building, Des Moines, Iowa 50309

CORPS OF ENGINEERS RESPONSES

June 8, 1976

Gus J. Karabatsos
Chief, Planning Division
Missouri River Division
Army Corps of Engineers
P. O. Box 103, Downum Station
Omaha, Nebraska 68101

Dear Mr. Karabatsos:

The draft environmental impact statement for the Missouri River Bank Stabilization and Navigation Project has been received and reviewed by my staff.

We have no comments at this time.

We appreciate the opportunity to review and comment on this proposed work.

Sincerely,

William J. Brune
State Conservationist

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
NORTHEASTERN AREA, STATE AND PRIVATE FORESTRY
6816 MARKET STREET, UPPER DARBY, PA. 19082
215-596-1672

8:00
June 18, 1976



Mr. Gus J. Karabatsos
Chief, Planning Division
Department of the Army
Missouri River Division, Corps of Engineers
Post Office Box 103, Downtown Station
Omaha, Nebraska 68101

Refer to: HQDPD-ER, Draft Environmental
Statement, Missouri River
Bank Stabilization Project

Dear Mr. Karabatsos:

wedge spoil disposal in the main channel (pp. 1-6) will have no direct effect on forested land. Some questions have occurred to us regarding other parts of the Bank Stabilization Project.

If the river is "self-scouring," sediment would be moved from the river channel downstream. The final Statement could describe the effect of channel narrowing on water velocity and sedimentation in lower parts of the Missouri River and in the Mississippi River.

For a more complete assessment of environmental impact we need more detail on some of the effects described on pages IV-4 and IV-5. We are particularly interested in the amount of habitat lost for the Indiana and gray bats and other species of fauna, and the other riverine vegetation lost; an estimate of the fishing and other water based recreation adversely affected by lowering the river bottom.

Thank you for the opportunity to review this Statement.

Sincerely,

DALE O. VANDENBURG
DALE O. VANDENBURG
Staff Director
Environmental Quality
Evaluation

CORPS OF ENGINEERS RESPONSES

See paragraphs 4.02.1.2.1 and 4.02.1.4.

This detailed statement pertains chiefly to maintenance of the project and the minor amount of construction remaining to complete the project. While wildlife habitat losses have accrued due to construction of the project since its initiation, most of these past actions are not necessarily relevant to the existing situation except as explained in paragraph 4.02.7.1. The specific project area is not considered to be habitat of the Indiana bat or gray bat. Reference is made to several paragraphs beginning with paragraph 2.04.6 for a discussion on recreation.



United States Department of the Interior

GEOLOGICAL SURVEY

Box 25046

Denver Federal Center

Denver, Colorado 80225

Water Resources Division

IN REPLY, PLEASE REFER TO:

CORPS OF ENGINEERS RESPONSES

May 21, 1976

Mr. Gus J. Karabatsos
Chief, Planning Division
Department of the Army
Missouri River Division
Corps of Engineers
P.O. Box 103, Downton Station
Omaha, Nebraska 68101

Dear Mr. Karabatsos:

Thank you for your letter of May 16, 1976. Your Draft Environmental Statement for the Missouri River Bank Stabilization-Navigation Project has been forwarded to the Acting Chief, Environmental Impact Analysis Program for their review and comments.

If you have any questions you can contact Daniel B. Krinsley, Acting Chief, Environmental Impact Analysis Program, U.S. Geological Survey, Geologic Division, Reston, VA 22092.

Sincerely,

Jack R. Carter
Jack R. Carter
Acting Regional Hydrologist

cc: Daniel Krinsley, Reston, VA
Mail Stop 760

Noted

IX-35





U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE CENTRAL REGION
ROOM 1836, 601 E. 12TH STREET
KANSAS CITY, MO 64108

CORPS OF ENGINEERS RESPONSES

MAY 25 1976

May 18, 1976

WFC242

TO: Associate Director, Hydrology, MMS - M2

FROM: *Elroy C. Balke*
Elroy C. Balke
Regional Hydrologist

SUBJECT: Draft Environmental Statement - Missouri River Bank Stabilization-
Navigation Project

The enclosed transmittal letter from the Chief, Planning Division, Missouri River Division, Corps of Engineers, and the draft Environmental Impact Statement are forwarded for response in accordance with NOAA Directives Manual with a copy of our reply.

The following are comments which may help in preparing a response:

"It is noted that the meteorological and hydrologic hazards to people using the public use areas and navigation facilities have not received specific mention we believe is justified. Flood and severe storm warnings are issued by Weather Service Forecast Offices throughout the reach of the Missouri River from Sioux City to the Mouth of the Missouri River via NMMS, law enforcement network, news media, and NOAA Weather Wire Service (NWMS). Hazards may arise from large and rapid inflow from heavy rains over the Missouri and the tributary drainage areas. Large Missouri main stem flood control reservoirs regulate flows in the river. Necessary increased releases to evacuate water stored during floods threaten members of the public fishing in the normally low water channel. Rapid rises in river stages flood parks, camping areas and other public use areas and provide major threats to towns and cities located along the river.

"In recognition of this problem, the National Weather Service has established a flood forecasting and

Paragraph 2.04.6.5 discusses the issuance of storm warnings by public agencies in the project area.

2

warning service for the Missouri River throughout the reach of the study area. Radar indications of heavy rain supported by telemetry and observer reports of rainfall amounts and river stages provide support for this service.

"We would appreciate receiving a copy of the final statement."

Enclosures

May 20, 1976

TO: Dr. William Aron
Director, Office of Ecology and Environmental Conservation (EE)

FROM: S. Grims *David C. Grims*
Actg Chief, Executive Affairs Staff (bx2)

SUBJ: Draft Environmental Statement - Missouri River Bank Stabilization-
Navigation Project

The Office of Hydrology has forwarded these comments from their field office with concurrence and an attached copy of an information sheet describing MMS services.

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

P.O. Box 459, Columbia, Missouri 65201

May 20, 1976

Mr. Gus J. Karabatsos
Chief, Planning Division
Department of the Army
Missouri River Division
Corps of Engineers
P.O. Box 103, Downtown Station
Omaha, Nebraska 68101

Dear Mr. Karabatsos:

As a result of our review of the Missouri River Bank Stabilization and Navigation Project, Draft Environmental Statement on Continuing Construction and Maintenance, we offer the following:

In place of 2.02.3, substitute the following: The soils of the eastern third of the Missouri River Basin developed under humid climatic conditions. Approximately 50 percent formed under prairie vegetation and are called Udolls. The other 50 percent developed under timber vegetation and are called Udolls. Soils of the remaining two-thirds developed under prairie vegetation. The Udolls occur in the warmer southern part of the basin and the Borolls occur in the colder northern part.

For further soils information, refer to Agriculture Handbook 296, "Land Resource Regions and Major Land Resource Areas."

We believe that the statement would be improved by describing the impacts on agricultural drainage due to accretion of land by the installation of river training measures.

Further discussion of dredge disposal sites in section 4.02.3. would allow better understanding of impacts of this work. Of particular interest are the impacts arising from disposal on land suited for agriculture.

We appreciate this opportunity to review and comment on this draft statement.

Sincerely,


Kenneth G. McManus
State Conservationist

CORPS OF ENGINEERS RESPONSES

1
Thank you; see paragraph 2.02.3.

2
The effect that the continuing maintenance of the navigation channel and bank stabilization structures will have on surface drainage of adjacent agricultural lands is considered to be insignificant and, therefore, is not addressed. The basis for this decision is that the proposed work will be at the water-land interface and within the river, not, as was in the past, considerable distance back from the river's edge. (Constructing new channels, blocking existing chutes and constructing extensive dike fields). These past actions did significantly affect surface drainage of adjoining lands.

3
The DEIS stated that it is the Corps' intention to place dredge spoil in areas within the navigational servitude limits of the river, thereby not affecting productive agricultural lands.

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

Federal Building-U. S. Courthouse, Room 345, Lincoln, Nebraska 68508

CORPS OF ENGINEERS RESPONSES


May 17, 1976

Mr. Gus Karabatsos
Chief, Planning Division
Corps of Engineers
P. O. Box 103, Downtown Station
Omaha, Nebraska 68101

Dear Mr. Karabatsos:

In reply to your letter of May 6, 1976, we have reviewed the Draft Environmental Statement for the Missouri River Bank Stabilization and Navigation Project. It does not appear to me that the project will have any significant effect on the environment. Therefore, I have no comments or recommendations for change.

Sincerely,



W. J. Parker
State Conservationist

Your comment is acknowledged.



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

ADDRESS REPLY TO
(HQS)
COMMANDER
DISTRICT
FEDERAL BLDG
180 MARKET ST
ST LOUIS MO 63101
.5922/RIS

22 JUN 1976

Department of the Army
Corps of Engineers
Missouri River Division
P. O. Box 103, Downtown Station
Omaha, NE 68101

Attn: IRDPD-ER

Gentlemen:

We have reviewed the draft environmental impact statement
for Missouri River Bank Stabilization and Navigation Project.
We have no comment to offer on this document.

Thank you for the opportunity to review your draft environmental
impact statement.

Sincerely,

[Signature]
J. W. HENDERSON

Captain, U. S. Coast Guard
Chief, Marine Safety Division
By direction of the District Commander

Copy to:
COMDT(G-NRP-2/73)
DOT SECDEF Region VII
DOT (ces) Office of Environmental Affairs
CEQ(5)

CORPS OF ENGINEERS RESPONSES



DEPARTMENT OF TRANSPORTATION
REGIONAL REPRESENTATIVE OF THE SECRETARY

ROOM 4M FEDERAL BUILDING
401 EAST 12th STREET
KANSAS CITY, MISSOURI

EX-41


June 11, 1976

Mr. Gus J. Karabatsos
Chief, Planning Division
Missouri River Division, Corps of Engineers
P. O. Box 103, Downtown Station
Omaha, Nebraska 68101

Dear Mr. Karabatsos:

We have reviewed the draft environmental statement for the
Missouri River Bank Stabilization-Navigation Project and find
that it adequately considers the effect the project may have
on areas under the jurisdiction of the Department of Transportation.

Sincerely,

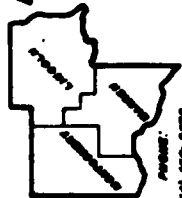

R. E. Waeche, MAJN USCG (Ret.)
Secretarial Representative
Region VII

cc: Mr. C. E. Melugin, FAA
Mr. J. B. Kemp, FHWA
Mr. J. H. Witthauer, FRA

Your comment is acknowledged.

CORPS OF ENGINEERS RESPONSES

BOONSLICK REGIONAL PLANNING COMMISSION
BOX-A 30 HWY. 47-PO. BOX 343 - WARRENTON, MO. 63383



CORPS OF ENGINEERS RESPONSES

EXECUTIVE BOARD
VICE-CHAIRMAN **SECRETARY** **TREASURER**
WILLIAM L. GALLAGHER **JACK BUTLER** **HAROLD GREEN**

June 3, 1976

Mr. Gus J. Karabatsos
 Chief, Planning Division
 Department of the Army
 Missouri River Division, Corps of Engineers
 PO Box 103, Downtown Station
 Omaha, Nebraska 68101

Dear Mr. Karabatsos:

At their regular monthly meeting May 27, 1976, the Boonslick Regional Planning Commission reviewed the Draft Environmental Statement for the Missouri River Bank Stabilization - Navigation Project. The Commission requested that the following comments be forwarded to you.

The work described in the Draft EIS is essential to maintain what transport we have on the Missouri River.

The economic factors and benefits are important to everyone.

One of the responsibilities of the Corps of Engineers is to maintain the waterways in a navigable condition.

The Commission feels that these are the only comments they have at this time regarding the EIS. Should the Commission be able to assist you in your work, please feel free to contact us.

BY DIRECTION OF THE BOONSLICK REGIONAL PLANNING COMMISSION

Sincerely yours,

Leland R. Johnson, Jr.

Leland R. Johnson, Jr.
 Executive Director

LBJR:gj

Your comment is acknowledged.



300 FOURTH STREET □ DES MOINES, IOWA 50319

515/201-5145

An Equal Opportunity Employer

June 29, 1976

Mr. Gus J. Karabatsos
Chief, Planning Division
Department of the Army
Missouri River Division,
Corps of Engineers
P. O. Box 103, Downtown Station
Omaha, Nebraska 68101

Refer to: MRD-PD-ER, Draft
Environmental Statement,
Missouri River Bank
Stabilization Project

Dear Mr. Karabatsos:

Enclosed are comments of our agency on the Draft Environmental Impact Statement of the Missouri River Bank Stabilization Project. These comments are based upon staff review and discussion.

High release rates of 60,000 to 70,000 C.F.S. from the upstream mainstem reservoir system have resulted in severe degradation to the bed of the river. Degradation through scouring occurs during high release periods and has had a lowering effect on the bed of the navigation channel of from 4 to 6 feet. When the river release rate is then cut back to 40,000 C.F.S., the lowering of the waterline by 4 to 6 feet in turn lowers the oxbows along the river that fluctuate with the river.

There is minimal recreation potential for boating or fishing on the river with a 40,000 C.F.S. release rate from upstream reservoirs. Also the water surface area for boating and fishing is greatly reduced and in places destroyed in the river oxbows by this lowering of the water table.

In addition to the adverse effect on recreation, the cumulative impacts of degradation intensified by channelization and bank stabilization may bring about the loss of hundreds of acres of sovereign land under the jurisdiction of the State Conservation Commission. The resulting degradation is lowering the ordinary high water line, causing land to emerge. A recent U. S. Supreme Court decision held that these emerged lands become private property when the riparian lands are in private ownership.

COMMISSIONERS

John G. Lene, Chairman
Burlington
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Baltimore
John C. Brophy
Lansing
Caroline J. Lumbard
Dulles
Marion Pike
Whiting
Herbert J. Reed
Winnetka
John C. Thompson
Forest City

DIRECTOR

Frederic A. Prosser

CORPS OF ENGINEERS RESPONSES

A discussion about the lowering of the river surface and the river bed has been added to paragraph 2.02.1.3.

There appears to be considerable power boating potential in the Missouri River judged from this kind of activity on the river immediately below Slouss City. The river current, however, appears too fast to accommodate pleasure boating in canoes and small rowboats, particularly if movement is attempted against the current. Sport fishing in the river seems limited to the bankline area and the area adjoining the dike structures; there are a few chutes and tributary confluences that also serve the fisherman. It is agreed that the reduction of water surface at the oxbow lakes between Slouss City and Omaha has adversely affected the boating on these waters. The reduction of water surface, but probably the water depth, has probably also adversely affected fish populations and consequently fishing in the oxbow lakes.

The remaining construction should not cause additional lands to emerge either through sediment accumulation or by causing the river surface to lower. The question of ownership of emerged lands will have to be resolved between the State and the private citizen.

Mr. Gus J. Karabatsos
June 29, 1976
Page 2

CORPS OF ENGINEERS RESPONSES

Losses of these public lands, the fisheries and wildlife habitat values they currently possess, and the opportunity for public recreation they provide are significant.

Your comment is acknowledged.

Thank you for the opportunity to review this statement.

Sincerely,



Fred A. Priewert, Director
Iowa Conservation Commission

FAP:DH:rc

IOWA DEPARTMENT OF TRANSPORTATION

To Office Program Management Date June 9, 1976
Attention James Cobb Ref. No. 010.05
From Patrick R. Cain
Office Advance Planning
Subject PHRS A-95 Review

CORPS OF ENGINEERS RESPONSES

The following project has been reviewed:

761636, Draft environmental statement, Missouri River
bank stabilization and navigation.

The Iowa DOT is interested in this project to the extent that
the availability of the authorized minimum navigational channel
width and depth is ensured.

Your comment is acknowledged.

In the event that a conference with the applicant and other
interested parties is requested, the Iowa DOT should be included.

PRC:ch

cc: Don Ward
Glenn Miller

THE STATE OF KANSAS



WATER RESOURCES BOARD

4th Floor, Mills Building
109 W. 9th Street
Telephone (913) 296-1187
TOPEKA, KANSAS 66612

June 14, 1976

Mr. Gus J. Karabatsos
U.S. Army Engineering Division
Missouri River
P.O. Box 103
Omaha, Nebraska 68101

Dear Mr. Karabatsos:

Reference is made to your letter of May 4, 1976, transmitting for state review your draft environmental statement for the Missouri River Bank Stabilization Project. The reviewing agencies have indicated no particular comments with respect to the draft statement as presented. We would note that under separate letter of an earlier date several of the agencies had responded to a public notice covering the proposed bank stabilization works throughout the river area. These comments were transmitted direct to the Kansas City office, and it would appear that they have been made a part of the environmental statement.

Very truly yours,

John M. Dewey
Assistant Chief Engineer

JMD:mf

Your comment is acknowledged.

CORPS OF ENGINEERS RESPONSES

COMMENTS

of the

MISSOURI DEPARTMENT OF CONSERVATION

on the

Draft Environmental Statement

for the

MISSOURI RIVER BANK STABILIZATION AND NAVIGATION PROJECT

June, 1976

CORPS OF ENGINEERS RESPONSES

Paragraph 2.03.2.1 - It is probable that the clearing of wooded habitat has had an impact on the Indiana and Gray bat as well as the species listed.

Paragraph 2.03.6 -

- a. It is generally true that there is quiet water behind dikes. However, this is due to the fact that dikes are built in deposition areas or quiet water.
- b. The uneven rock surface does provide niches, but the statement that "small fish move upstream with comparative ease" on the reveted side of a river bend is questioned.
- c. We do not agree that rock dikes provide more diverse habitat than a series of chutes and sloughs. Chutes and sloughs would provide a wider range of bottom types and water conditions than rock dikes. The statement that chutes and sloughs are "the most productive of river habitats" is also an indication of diversity.

Paragraph 2.03.6.1 - Degradation of the river bed is due to the increased sediment transport capacity of the river because of channel constriction (dikes and revetment) and the clearer, cooler water discharged from the main stem reservoirs.

Paragraph 4.02.1.2 - The alteration of the existing main channel bed is by itself probably not significant. However, alteration of the main channel was the reason for removing the first snag, constructing the first dike and dredging the first cubic yard of sediment. The impacts of the alterations are: (1) movement of sediment, some of which will be deposited behind structures; (2) lowering the riverbed which results in side channels being left "perched, high and dry" and (3) channelization of the river system with impacts on the floodway.

The Indiana and gray bats are not listed as representatives of mammal populations found in the project reach because their present-day range is considered to be south of the river in its lower reach.

Paragraph 2.03.6 has been modified in an attempt to better present the existing aquatic life setting generally associated with rock/water interfaces in the project area.

Material has been added to the text, in paragraph 2.02.1.3, describing observed degradation trends.

These impacts of the alternatives are recognized in paragraph 2.03.6.1. Material has been added to the text, in paragraph 1.08.8, describing the dike notching program which is designed to avoid further loss of aquatic habitat behind the dikes and possibly restore some of the areas that have recently silted in. The Mitigation Study which is underway will consider means of restoring water to some of the cut-off lakes and channels that are drying up due to lowering of the water surface in the main Missouri River channel.

CORPS OF ENGINEERS RESPONSES

Paragraph 4.02.1.3 - Elimination of thousands of acres of water, sandbars and wetlands has concentrated migratory waterfowl use in the few remaining areas. By concentrating birds in a few areas the stage is set for serious disease epidemics with severe impacts.

Paragraph 4.02.1.4 - What percent of "new" land is actually on the tax rolls?

Paragraph 4.02.2.2 - Studies utilizing sonic tags in flathead catfish reveal heavy utilization of snags especially during periods of high water. Data seems to indicate that snags are utilized regardless of location.

Paragraph 4.02.4.1 - We have seen reports that indicate railroads may be more energy efficient due to more direct routes, reduced hauling by trucks and less loading and unloading.

Paragraph 4.02.6.5 and 6 - Mud banks and shallow water areas are important for commercial fish and fishing.

Your statement about potential for waterfowl disease epidemics is true for density dependent disease organisms. The potential also exists on other areas where waterfowl concentrate either because of natural attractiveness or managed attractiveness. The proposed Corps action of completion of the remaining construction and the maintenance of the existing project is not expected to further affect the concentration of migrating waterfowl.

Land that is accreted is gradually brought into various uses. The time at which this land is entered on the tax rolls is at the discretion of the local taxing jurisdiction. To determine when and how much of this new land is actually on the tax rolls, would require an extensive, costly survey.

Thank you for the information; see paragraph 4.02.1.8.

There are many qualifying conditions which should be confronted in responding to such reports; chief among these would be the commodity, the quantity shipped, the points to be serviced, and the transit time involved. Generally, goods that are moved by inland waterways are of low value, high in volume, moved between points amenable to the system, and time is not a critical consideration. That the barge is a more efficient user of fuel per ton-mile is generally accepted. This was illustrated by a study done for the Federal Railroad Administration in 1973 by Iowa State University which arrived at the estimated gallons of fuel per ton/mile: barge - 0.002, rail - 0.003, and truck - 0.021. Thus, the barge haul must be 1.5 times that of the rail haul to reach an indifference point for energy efficiency.

Agree that shallow water areas and river banks can be beneficial fish habitat in the Missouri River. Particular attention is being devoted to preserving and enlarging the amount of shallow water area associated with the Missouri River in the present, on-going fish and wildlife mitigation study.

CORPS OF ENGINEERS RESPONSES

Most of the dredge spoil in previous years has been placed in water areas behind dikes where it did not impact adversely the flooding capacity. Recently, as described in paragraph 1.09.5, we are investigating techniques of depositing spoil elsewhere in the main channel, where it will impact neither an aquatic habitat behind dikes or on floodway capacity.

10

Paragraph 4.02.6.10 - Dredge spoil disposal has an adverse impact on floodway capacity.

Noted.

11

Paragraph 6.02 - We are quite pleased with the Corps of Engineers efforts to minimize impacts by modifying structure design.

Potential: recreation benefits were first considered in 1964. There are additional benefits that will be realized as planned recreation features are added to the project.

12

Paragraph 7.01 - We question the existence of true net benefits to recreation from the project.

CHRISTOPHER S. BOND
GOVERNOR



JAMES L. WILSON
DIRECTOR

Missouri Department of Natural Resources

P.O. Box 176 Jefferson City, Missouri 65101 314-751-4952

CORPS OF ENGINEERS RESPONSES

May 8, 1976

Mr. George Lineberry
Office of Administration
Room B-9, Capitol Building
Jefferson City, Missouri 65101

RE: A-95 Review #76050095 - Omaha Corps of Engineers - Draft EIS -
Missouri River Bank Stabilization and Navigation Project

Dear Mr. Lineberry:

The Department of Natural Resources has reviewed the above noted project and has no comments to offer.

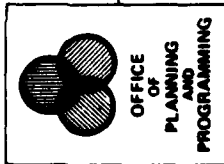
Sincerely yours,

DEPARTMENT OF NATURAL RESOURCES

James L. Wilson
James L. Wilson
Director

JLW:crp

Division of Planning and Policy Development
Marvin J. Nadler, Director



STATE OF NEBRASKA

BOX 94801 · STATE CAPITOL · LINCOLN, NEBRASKA · 68509 · (402) 471-2414

Governor J. James Egan
State Planning Officer

W. Don Nelson
Director

CORPS OF ENGINEERS RESPONSES

May 28, 1976

Gus J. Karabatsos, Chief
Planning Division
Department of the Army
Missouri River Division, Corps of
Engineers
P. O. Box 103 Downtown Station
Omaha, Nebraska 68101

Dear Mr. Karabatsos:

Project 76 05 05 85
Missouri River Bank Stabilization-Navigation

Under the provisions of OMB Circular A-95, this office has completed a state level review of the subject draft environmental statement.

The proposed project does not appear to be in conflict with any state level comprehensive plans and does not represent a duplication in the expenditure of state or federal funds.

The enclosed comments were received from the Extra Metropolitan Council of Governments. This letter completes the state clearinghouse review.

Sincerely,

Steve Charleston
Steve Charleston
Regional Planner

SC:jb

cc: John Krueger

Your comment is acknowledged.

OMAHA-COUNCIL BLUFFS METROPOLITAN AREA PLANNING AGENCY

RESOLUTION NUMBER 1976 - 135

WHEREAS, the members of the Omaha-Council Bluffs Metropolitan Area Planning Agency (MAPA) have been formally designated by their respective legislative bodies to act as the official representative in planning matters of mutual concern; and,

WHEREAS, the Missouri River Division of the Corps of Engineers has requested clearinghouse review of their Draft Environmental Statement for Continuing Construction, and Operation and Maintenance for the Missouri River Bank Stabilization and Navigation Project; and,

WHEREAS, MAPA has given due consideration to said project, Therefore be it

RESOLVED, that MAPA approves and recommends the continuing efforts of the Corps of Engineers on the Missouri River Bank Stabilization and Navigation Project with the following comments:


1. Innovative methods should be used to develop and maintain the natural character of the River during continued construction, operation and maintenance along the project area.
2. High priority should be given to developing and maintaining continuity between natural areas. The concept of preserving and establishing these unbroken corridors consistent with the MAPA Open Space Plan and Program.

Agree that conservation and, to the degree justified, enhancement of the diversity of character of the river should be a part of the remaining construction and the annual maintenance of the project. The environmental notch program is an example in being of the current effort to accomplish the objective. It would appear that the Missouri River Basin Commission flood plain management study of the Missouri River below Yankton, South Dakota, offers a great opportunity for consideration of such environmental values as open space, "green belt," and habitat preservation (see paragraph 3.04).

3. Nearly all of the aquatic biological production of the River is attributable to the back waters and sloughs adjacent to the River. These highly productive areas should be maintained and further investigation should be given to establishing more such areas. The practice of using these areas as dredge fills should be discontinued.

RESOLVED further, that MAPA approves and recommends said project be forwarded to the appropriate federal agency.

PASSED this 27th day of May, 1976.


Adrian P. Jaworski, Secretary-Treasurer
Emmett F. Ryan, Chairman

CORPS OF ENGINEERS RESPONSES

See paragraph 4.02.7.2. The last time dredging was necessary, disposal was in the deeper portions of the main channel. The task force identified in the referenced paragraph felt this disposal site was much less harmful to the environment than is shallow water areas. Behind a structure may still be an approved site; however, only the areas behind structures that are found to contribute least to the shallow water environment will be developed for dredge disposal.



ENGINEERING DEPARTMENT

City of Saint Charles, Missouri

200 North Second Street Saint Charles, Missouri 63301
(314) 625-2600

JOHN C. McCONVERY, P.E.
City Engineer

May 27, 1976

Mr. Gus Karabatsos
Department of the Army
Missouri River Div., Corps of Engineers
P.O. Box 103, Downtown Station
Omaha, Nebraska 68101

Dear Mr. Karabatsos:

The City of St. Charles Engineering Department has reviewed the draft Environmental Statement for the Missouri River stabilization-Navigation Project and finds that the proposed work will not be harmful to the City.

We would like to state, we are in favor of the project and look forward to increased use of the Missouri River by barge traffic.

Sincerely,

John C. McConvery, P.E.
City Engineer

JCM:kr

Your comment is acknowledged.

COMPS OF ENGINEERS RESPONSES

P. O. BOX 447

SILOUX CITY, IOWA 51102

TELEPHONE (212) 279-6286

June 17, 1976

Col. Harry F. Humada
Division Engineer
Army Corps of Engineers
P.O. Box 103 - Downtown Station
Omaha, NE 68101

Dear Col. Munson:

have reviewed the Draft Environmental Statement on Continuing Construction and Operating and Maintenance of the Missouri River Bank Stabilization and Navigation Project prepared by the Missouri River Division, Corps of Engineers, and offer the following comments:

The document offers an excellent background of the Missouri River Bank Stabilization and Navigation Project. We are quite aware of both the positive and negative environmental impacts of the project on the area. We believe the project has been instrumental in draining thousands of acres of land thereby allowing agricultural uses.

As the degradation of the channel continues the life expectancy of the oxbow lakes and the few remaining wetlands are seriously diminished. In addition, as a result of their phenomenon, we are experiencing a rapid loss of native woodland. We strongly disagree with the findings of the report stating that the river vegetation and its bottom land woods cannot be returned. We can replace these woods if we develop appropriate actions, programs, with adequate funds. We should be working on a system and a plan for establishing a green belt along the river.

The Corps should also experiment with the variety of structures to prevent the scouring of the bottom and to retain or increase the water surface level.

We believe that it would be advantageous for the Corps to work with the states to establish an official high water mark along the stretch of the river between Yankton, South Dakota, and the confluence of the Little Sioux and Missouri River. This would be a difficult task but

The "pre-project" Missouri River ecosystem cannot be re-established. This is not to say that reforestation of the flood plain is not possible; it is technically feasible, but it remains to determine if it would be socially or economically acceptable. The Missouri River Basin Commission's current flood plain management study offers an opportunity for "green belt" consideration by the states of the lower river basin.

The environmental notch program is attempting to enhance and to preserve the water surface area of the Missouri River.

The Corps of Engineers is not, at this time, aware of a Federal need to identify the ordinary high water mark in the reach of the Missouri River between Yankton, South Dakota, and the confluence

2002
 BRONSON
 CHICKEN
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 SEA CREST
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 MONROE COUNTY
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 RESIDENT BRIDGE
 SOUTH CITY
 TOWN

Nebraska
SARASOTA CITY
SARASOTA COUNTY
WOMEN
WOMEN
SOUTH BEND CITY

Brush Station
BLK POINT
NORTH BIRM CITY
JUNIOR COUNTY

IX-59

Col. Harry F. Muma

2

June 17, 1976

It needs to be accomplished so that public lands can be delineated and additional lands acquired either through purchase, imminent domain, or easement.

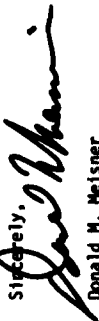
We note that 56 of the initially approved recreational access sites remain to be constructed and believe that these activities should be accelerated. There is a great lack of public access points on certain stretches of the river, particularly the stretch upstream from Sioux City.

It is our observation that upstream from Sioux City unnecessary structures have resulted in loss of considerable amounts of woodlands and wetlands. The process has been to build the structures, wetlands dry up, and conversion to other uses to the benefit of a few and to the loss of the general public.

It appears that many of the adverse environmental effects listed in the report are directly tied to the construction of the river for navigation purposes. It is therefore important to know the future of navigation on the Missouri River. If navigation is to be maintained, this gives us one set of criteria from which to work. We do believe much can be done to eliminate or minimize those adverse environmental effects listed. On the other hand, if navigation is not to be a long term use of the river, the criteria changes completely. Much more latitude is possible for the planning of the minimization of the adverse environmental effects.

Overall the project has worked well, and we should, with the states, work to overcome those adverse environmental effects listed in the report and maximize the benefits from the project. We do not agree with the report on the irretrievable losses as listed.

Sincerely,



Donald M. Meisner
Director

ec

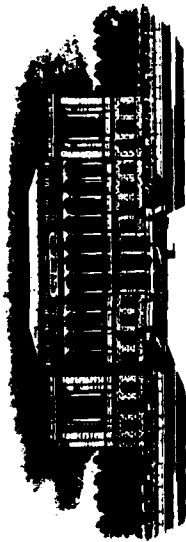
CORPS OF ENGINEERS RESPONSES

of the Little Sioux and Missouri Rivers. Interstate interests in identifying the ordinary high water mark have been identified at recent meetings with the public in connection with the Metropolitan Sioux City and Missouri River, Iowa, Nebraska, and South Dakota study. This study does have the potential for identification of the ordinary high water mark.

The Corps of Engineers in consultation with the Bureau of Outdoor Recreation and with assistance from Nebraska and South Dakota is studying the feasibility of designation of the river between Gavins Point Dam and Ponca State Park, Nebraska as a national recreation river and its development under terms of the Wild and Scenic Rivers Act.

Your observation is noted; that reach of the river is outside the scope of this EIS.

Continued Missouri River navigation is the recommendation of the EIS in that the large commitment to date and the somewhat minimal future environmental effect are far outweighed by the many and far reaching, socio-economic benefits. The commercial tonnage moved in 1977 was about 3.3 million tons with full Missouri River potential after project completion estimated at 5.0 million tons. You are also referred to paragraph 2.05 for a discussion of navigation with upstream water supply depletions.



WILLIAM J. BENNETT
MAYOR

City of St. Joseph

ST. JOSEPH, MISSOURI

May 20, 1976

Gus J. Karabatsos
Chief, Planning Division
Department of the Army
Missouri River Division
Corps of Engineers
P.O. Box 103, Downtown Station
Omaha, Nebraska 68101

Dear Mr. Karabatsos:

Thank you very much for the draft Environmental Statement for the Missouri River Bank Stabilization-Navigation Project.

As pointed out in Paragraph 3.02, Page 111-1, there are no known conflicts between the remaining construction and existing or proposed federal, state or local land use plans, policies and controls. Section V, Page V-1 points out the adverse environmental effects to the channelization and none of these effects relate to urban communities. This channelization plan, in my opinion, can only benefit St. Joseph by the controlling of the channel and providing for commercial navigation.

Your comment is acknowledged.

Yours truly,

W. J. Bennett
Mayor of St. Joseph

WJB:dh

**EXECUTIVE COMMITTEE
WESTERN RAILROAD TRAFFIC ASSOCIATION**

ROOM 1118, 222 SOUTH RIVERSIDE PLAZA
CHICAGO, ILLINOIS 60606

GEORGE E. ANDERSON
WATER RESOURCES ANALYST

TELEPHONE (312) 648-7811
648-7812

July 15, 1976

Mr. Gus J. Karabatsos
Chief, Planning Division
Missouri River Division
U.S. Army Corps of Engineers
P. O. Box 103 Downtown Station
Omaha, Nebraska 68101

Dear Mr. Karabatsos:

Thanks for your letter of May 16, 1976 enclosing a copy of the Draft Environmental Statement on continuing construction and O&M on the Missouri River navigation and bank stabilization project. I welcome the opportunity to comment on this statement and appreciate the two week extension for receiving comments granted during my telephone conversation with you on July 2nd.

Since the draft EIS is reported to be a summarization of documents assessed in the Missouri River Division Task Force Final Baseline Study Project Report on "Missouri River Bank Stabilization and Navigation Project", I had hoped to have the opportunity of visiting the Division Office and reviewing the baseline study documents prior to submitting these comments. Unfortunately this was not possible and consequently my comments may raise issues which have already been covered in reports that are reportedly available for inspection upon visitation of the Missouri River Division office.

Project Cost & Construction Status

Section 1.02 on page 1-1 indicates the current 9 foot navigation project was authorized by Congress in 1945 in accordance with the Corps report (of Dec. 30, 1938 from the Missouri River Division) printed in H. Doc. 214, 76th Congress, 1st Session. A review of H. Doc. 214 indicates Congress was told that the 9 ft. navigation project would cost only \$35.8 million more than what had already been spent (\$142,200,000) at that time on the prior 6 ft. project. Based on the current project cost estimate of \$450 million, the additional cost is already \$307.8 million more than had been spent on the 6 ft. project by 1938. This is 8.6 times the project document estimate.

It should be noted that the Engineering News Record Construction cost index has increased some 11.56 times during the same time period, while the reported cost estimate is only 8.6 times that in the project document.

Mr. Gus J. Karabatsos
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CORPS OF ENGINEERS RESPONSES

During the seven year delay (from 1938 to 1945) between the date of the Corps report recommending the project and the authorization by Congress, the estimated cost of the 6 ft. project was increased from 172 to 184 million dollars and the estimated cost of the 9 ft. project was likewise increased by approximately \$12 million from 178 to 190.2 million dollars. In 1945 the estimated added cost of the works necessary to obtain a 9 ft. project was about \$35.7 million more than had been spent at that time on the 6 ft. project. Based on this estimate and the subsequent amount of money spent for the project, the project should have been completed in fiscal year 1951.

What has actually happened during the subsequent 31 years is that a total of 25 new project cost estimates were made by the Corps and thru June 30, 1976 \$243 million had been spent to obtain a 9 ft navigation channel. This is 6.5 times what the Corps estimated would be necessary at the time the project was authorized by Congress.

As recently as ten years ago, on June 30, 1966, the estimated cost of the project was \$73,400,000 less (i.e. \$376,600,000) than the current estimated cost, and the estimated completion date at that time was 1967 for the lower portion and 1969 for the upper portion of the navigation project. During the same 10 year period approximately \$50 million was spent on the project or about \$5 million per year but the estimated cost of the project increased nearly one-half again as rapidly.

Since the EIS covers the continuing construction work as well as the O&M for the project, it should be pointed out that an additional \$43,546,000 has yet to be spent on the project and that the total project as well as the additional dike and revetment construction work is not scheduled for completion until Sept. 1982. More specific details on this additional work would seem appropriate for the EIS.

Congress and the public have clearly been greatly misled as to the amount and cost of the channel regulating work to be constructed for the purpose of obtaining a 9 ft channel. Inflation and the rather minor additional cost of recreation facilities plus land and damages would increase the project cost somewhat,

Since construction costs do change over time, just as an individual's salary increases to accommodate increasing cost of living, updated cost estimates are submitted to Congress annually. It should further be noted that shortage of civil works funds during the war resulted in significant deterioration of construction works, resulting in added rehabilitation costs.

A current cost estimate is prepared annually for budgetary submittal to Congress which accommodates expenditures since last submitted to Congress and a current cost estimate of remaining work items.

During this ten-year period, the ENR construction cost index more than doubled or increased 120 percent, which would more than explain the slightly less than 47 percent increase in the cost estimate given a constant annual expenditure.

We have revised paragraph 1.09 to outline the remaining completion items for channel stabilization structure work which is expected to be completed prior to 1982.

The impact of inflation on construction costs has been extremely dramatic during the previous 3 or 4 decades, impacting construction costs to a much greater extent than seems implied in the comment.

Mr. Gus J. Karabatsos
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CORPS OF ENGINEERS RESPONSES

but there are clearly other major reasons why the estimated cost is many times the project document estimate. While the cost estimate presented in H. Doc. 214 was obviously very inadequate, it is possible that additional major contraction and regulating work was performed which was not contemplated back in 1938. A more detailed history of the existing project including the dike and revetment work which has been performed and how and why this work has differed so greatly from the plan of improvement in the authorization document would be helpful.

An important question to be raised and discussed in the EIS is whether the project objective will ever be obtained by regulating works alone. Quite possibly additional flow will be required beyond that which can be furnished by the main stem reservoirs and by the construction of additional reservoirs on the tributary streams and rivers which discharge into the Missouri. It would seem desirable for the final EIS to present the latest curves showing the estimated future water supply and depletions for the Missouri River Basin and to discuss the possible impact of these projected depletions on the existing navigation project. The impact of the future water supply could significantly influence current decisions regarding continuation of the present navigation project. If it is likely that the navigation project depth in the future can only be obtained by means of a series of locks and dams, this should be stated.

Project Economics

The project document report (printed in H. Doc. 214, 76th Congress) stated the dike and revetment work for a 9 ft. channel would cost only \$6 million more than the \$29.2 million necessary to complete the 6 ft. project, and the annual maintenance cost would be the same as for the 6 ft. project. The report stated that going from a 6 ft. to 9 ft. channel would reduce the cost of maintenance and operation of the commercial water carriers and that "recent data furnished by the Inland Waterways and River commercial carriers indicate that a saving of 1 mill per ton mile is a conservative estimate." The report stated this 1 mill per ton-mile in transportation costs would justify the increased cost of \$6 million for a 9 ft. channel "if the traffic never exceeded about 600,000 tons per year".

As explained in the Syllabus, the EIS is of limited scope, recognizing the existing setting as the base condition and assessing effects of the remaining construction and annual maintenance based thereon.

A discussion about the project conditions under water depletions is presented in paragraph 2.05.

Mr. Gus J. Karabatsos
July 15, 1976
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The report reviewed the potential tonnage estimate for a 9 ft. channel which had previously been made by the Kansas City District Engineer (\$11,800,000 tons per year with a savings to shippers of \$1 per ton) and considered this estimate of prospective commerce to be conservative. The report stated the total prospective commerce between Sioux City and the mouth of the Missouri River is thus about 12,000,000 tons annually. It is important to note that the present 9 ft. project was justified solely on the basis of navigation benefits due to additional waterway traffic and a reduction in the waterway carriers' operation and maintenance costs. The project document also stated:

"Present authorizations for the 6-foot projects do not specifically provide for some methods of improvement, such as the making of cut-offs and the closing of minor channels by means of dams. It is believed advisable to include these methods in any new project."

In 1951 the Subcommittee on Army Civil Functions of the House Committee on Appropriations passed a resolution directing the Corps of Engineers to make and submit to it planning reports for all active civil works projects. In Jan. 1952 a planning report on the Missouri River navigation project consisting of a July 28, 1950 report by the Missouri River Division Engineer was submitted by the Corps to the Subcommittee. The Subcommittee directed the committee staff to make an analysis of the benefits shown in the planning report. In a hearing held on June 30, 1952, the preliminary results of this analysis by the staff were presented to the Subcommittee. A 47 page record of this hearing was printed by the Government Printing Office and a seven page report of the Subcommittee study of the Corps' Jan. 1952 planning report was printed on July 2, 1952. A copy of the Subcommittee report is enclosed as attachment #1 to this letter.

Background information on the project economics values presented in the Draft EIS in section 1.07 on page 1-2 was recently obtained by telephone from Mr. Ron Roberts. The procedure for determining the navigation and bank stabilization benefits is apparently the same as was used in Appendix III of the July 28, 1950 report on this project by the Missouri River Division (see document #3 on page 3 of the Bibliography in the Draft EIS). A table comparing the current economic analysis values with the July 28, 1950 values together with the values presented in the January 12, 1953 report of the Missouri Basin Survey Commission is enclosed as attachment #2.

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These data are quoted from secondary data sources and appear to be accurate reporting from printed documents with the exception of "\$11,800,000". Obviously, the \$ should be deleted.

Mr. Anderson was informed that reanalysis of the referenced 1950 report had yet to be accomplished, and that the current data were based principally on the methodology presented in the 1950 document.

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Attachment #3 consists of a copy of pages 113 thru 123 in the MBSC report which presents an in-depth analysis of the project economics presented in the Corps report of July 28, 1950. Attachment #4 presents a graph showing the 50 year projection of commercial traffic from the July 28, 1950 report and the actual commercial tonnage from 1969 thru 1975.

A review of the Corps' economic analyses for this project indicates the navigation benefits, which were the primary benefits claimed for the project when authorized by Congress, represented only 25 percent of the benefits in the July 28, 1950 report analysis and only 15 percent of the benefits in the current analysis. In his July 28, 1950 report, Gen S. D. Sturgis concluded "the project is justified from the (bank) stabilization standpoint alone and the project name should be appropriately changed to Missouri River Channel Stabilization and Navigation Project, Sioux City to the Mouth". One could also conclude, that the Missouri River Navigation project was not justified on the basis of benefits to navigation. Therefore, unless significant additional benefits were claimed for the project it could not be justified.

The accuracy of the average annual navigation benefits of \$6,699,000 in the July 28, 1950 report were questioned by both the House Appropriations Subcommittee on Army Civil Functions (see attachment #1) and the Missouri Basin Survey Commission (see attachment #3). The Subcommittee noted that the navigation benefits in the July 28, 1950 report were based on a potential tonnage of 5 million tons annually being reached by the year 1980 whereas the BERH report of May 4, 1950 (see document #2 on page 3 of the Bibliography in the Draft EIS) merely estimated a potential tonnage of 4 million tons annually by the end of the 50 year project economic life in 2010. As noted on page 3 of attachment #1, the BERH report estimated the average annual navigation benefits assignable to the bank stabilization work to be only \$2,450,000.

The average annual navigation benefits of \$6,534,000 presented on page 1-2 of the Draft EIS are the same as were presented on page 7 of the Omaha District's April 1965 "Review Report on Missouri River in North Dakota, South Dakota and Nebraska." As seen in attachment #4, as of April 1965 the rapid growth in commercial traffic during the period of 1959 thru 1964 would suggest that the projected traffic growth presented in the July 28, 1950 report could be accepted for estimating the future average annual navigation benefits. As is further noted in attachment #4,

A very significant function of the project structures is the provision of bank stabilization which results in a reduction in eroded farmlands and urban areas, and has resulted in the accretion of new lands for a variety of uses. Thus, the structures serve a dual function of bank stabilization and navigation. It would have been impossible to have developed the navigation channel without simultaneously stabilizing the river banks.

This statement contradicts the Committee Report, attachment # 1. The committee report notes that this figure was computed by the committee staff on the basis of their interpretation of the data in the BERH report.

Mr. Gus J. Karabatos
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however, the actual commercial tonnage since 1964 has leveled off and tends to be fluctuating around 2.4 million tons. Has the \$6,534,000 value presented on page 1-2 of the Draft EIS been updated since the January 1965 report? It would seem in order for the final EIS to include a graph and/or table showing the most current estimate of the projected waterway traffic for the project with a break-down of the tonnage and estimated savings per ton by commodity. Were the savings per ton used in obtaining the \$6,534,000 value based on the origin to destination movement of the projected traffic?

The erosion control benefits for agricultural lands presented in the July 28, 1950 report were also challenged by both the Subcommittee on Army Civil Functions and the Missouri Basin Survey Commission. The Subcommittee's comments are presented on pages 5 and 6 of attachment #1. The Missouri Basin Survey Commission made a detailed analysis of the July 28, 1950 report benefits on bank erosion control and land enhancement of agricultural lands. Their analysis is presented on pages 113 thru 116 of attachment #3.

The annual erosion control benefits for agricultural land in the July 28, 1950 report consisted of the following:

(a) Prevention of erosion and increased land use in the meander belt	\$ 6,696,000
(b) Increased utilization of agricultural land landward from the meander belt	3,700,000
(c) Accreted land due to dikes and revetment . .	1,399,000
TOTAL	\$11,795,000

As stated on page 116 of attachment #3, the MBSC did not accept the erosion control benefits (c) for accreted land because their study indicated the value of the resulting cultivated land approximates the labor and machine cost investments necessary in preparing the land for cultivation. The Commission also did not accept the erosion control benefits (b) or all of (a) from increased utilization of agricultural land due to the elimination of the erosion hazard. As stated on page 116 of attachment #3:

"Floods and not threat of streambank erosion appear to have caused abandonment of farmsteads in both stabilized and unstabilized reaches."

CORPS OF ENGINEERS RESPONSES

The average tonnage for 1965 through 1975 was 2.4 million tons ranging from 1.8 to 2.8 million tons. It should be noted that 1976 tonnage was 3.1 million, increasing to nearly 3.3 million tons in 1977. The average annual benefits attributed to navigation were estimated at \$6,890,000 in the 28 July 1950 report by the Division Engineer, and subsequently adjusted in 1963 to \$6,534,000, the value used in the impact statement. The savings per ton were determined to be \$3.00 based on origin-destination movements. The recently initiated National Waterway Study, a Congressionally authorized study, will further address the adequacy of the existing national navigation system for existing and anticipated future waterway system needs.

The referenced Missouri Basin Survey Commission report was replete with caveats concerning time and resource limitations constraining the study quality and thoroughness. Although we agree with their deletion of category (b) as we reviewed the 1950 report in a similar manner; we disagree with their concerns for benefits attributed to accreted lands. The benefits derived accommodate a land use conversion cost. The MBSC basis for concluding these benefits were inappropriate, apparently was based upon a sample range of land conversion costs (\$60-\$150 per acre). These data suggest an upper bound conversion cost 2.5 times the least cost, hardly sufficiently finite to draw any substantive conclusions about the appropriateness, or the actual value of benefits appropriate to this benefit category. They apparently were constrained by their limited resources in evaluating this benefit category.

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"Field trips and interviews with people who have known the area for years led to the conclusion that utilization of the flood plain has not been increased as a result of the channel stabilization program."

"The Commission found no evidence of any appreciable increase in the utilization of the flood plain as a result of channel stabilization, but a small amount may have resulted."

The only erosion control benefit for agricultural lands found acceptable to the Commission was the value of the land for the 9,094 acres per year which the Corps indicated would normally erode each year. Based on a value of \$106 per acre this amounted to \$963,964 or only 8.2% of the \$11,795,000 in erosion control benefits for agricultural land claimed in the July 28, 1950 report. In view of the thoroughness of the Commission's analysis of this issue and its impact on the worthiness of the project, the final EIS should respond to the Commission's conclusions and provide whatever documentation is available regarding the \$20.5 million in annual benefits currently claimed for erosion control of agricultural land.

As stated on page 117 of attachment #3, the Commission did not have the time and facilities to make an independent study of the \$8,082,000 figure for erosion control benefits for high-valve installations. As noted in attachment #2, this benefit is currently estimated by the Corps to be approximately 14.4 million dollars per year.

The Tec-Search Inc. report of January 6, 1966 on the proposed extension of the Missouri River navigation project from Sioux City to Yankton (see document #14 on page 4 of the Bibliography in the Draft EIS) accepted only \$11,600 x 100/\$1,321,000 = 8.45% of the Corps' estimate for erosion control benefits for agricultural land with the proposed project extension, which had been evaluated in a similar manner as for the existing Missouri River navigation project from Sioux City to the mouth.

Willingness of Local Cooperation
as A Practical Measure of Project Worthiness

The December 5, 1952 report on "The Civil Functions Program of the Corps of Engineers" to the House Public Works Committee from the Subcommittee to Study Civil Works presented the following

The current document addresses the desirability of completing construction and continuing maintenance. Revision of the benefits has been made to accommodate increased capital investment, agricultural production, and price levels.

The erosion control benefits for high value installations have been moderately updated to accommodate price escalation since the original analysis.

It is apparent that the results of the Tec-Search, Inc. report prepared at the expense of a Committee of South Dakota and Iowa railroads are in disagreement with the Corps estimate of erosion control benefits. Although some similarities exist between the methodologies for estimating erosion control benefits, it is believed the differences in methodologies are sufficient to explain the differences in the conclusion.

Mr. Gus J. Karabatsos
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conclusions on page 34 of House Committee Print No. 21, 82nd Congress:

"A skeptical approach should be taken in the acceptance of favorable economic analysis based entirely on the theoretical and mathematical computations."

also,

"A more practical measure of the worthiness of an undertaking is the willingness of the immediate beneficiaries to participate in the work by the contribution of funds proportionate to the local benefits."

A similar objective for cost sharing was presented, with specific reference to waterway projects, in the June 1973 report of the National Water Commission Report on "Water Policies for the Future" as follows:

"If non-federal interests agree to repay the first cost of a waterway, the Congress and the public can be sure that those urging the project are sincere in believing that it is justified. Thus, cost sharing would be effective in eliminating political pressures from a group seeking a project for no other reason than that they expect it to be paid for by the Federal Treasury."

Since the benefits claimed for the "Missouri River Bank Stabilization and Navigation" project have been seriously challenged, it would appear desirable to apply the House Public Works Subcommittee test of the worthiness of the project by "determining the willingness of the immediate beneficiaries to participate in the work by the contribution of funds proportionate to the local benefits." This test should be applied in particular to the erosion control benefits for agricultural land since these benefits constitute the major item of benefits claimed for the project and since independent analyses suggest that up to 90% of these benefits can not be substantiated.

A review of the Corps report in H. Doc. No. 214, 76th Congress, which was the basis for the authorization of the current 9 ft. navigation project by Congress, reveals that this test had already been applied by the Corps to what is referred

We disagree with the conclusions of your "independent sources". Further, Congress has had an annual review which has resulted in the project reaching more than 90 percent completion.

Mr. Gus J. Karabatos
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to as the "ordinary lands" along the Missouri River. A reproduction of the section on local cooperation from H. Doc. No. 214 is inserted below.

MISSOURI RIVER, SIOUX CITY TO MOUTH

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VII. LOCAL COOPERATION

27. *Local cooperation.* Local cooperation had its inception in local pressure for protection of land from erosion. As a result, isolated works were constructed, which were not coordinated into a comprehensive plan and usually without much benefit to navigation. The project authorized by the River and Harbor Act of March 4, 1915, provides that cooperation from benefited localities may be required where any improvement confers special benefit, and authorizes receipt of contributions from private parties to be expended with Government funds upon authorized work where such would be in the interest of navigation. The Secretary of War approved the general principle of cooperative construction on the Missouri River below Kansas City on the basis that 25 percent of the cost of any special installation shall be paid by the United States and 75 percent by the local interests. The prosecution of works under this theory, while plausible, proved to be a mistaken policy. It was found that, except in rare instances of wealthy communities or large concentrations of values, no such cooperation was forthcoming, and that ordinary lands along the Missouri River could not bear their share of the cost. Consequently, for several years no local cooperation has been required from landowners in the execution of the existing 6-foot project.

28. *Middle river.*—The authorization for this section of the river does not require any local cooperation.

As noted in the insert, it was determined that "ordinary lands", which obviously include the agricultural land, "could not bear their share of the cost." From this it must be concluded that the actual bank stabilization benefits to the ordinary land within the meander belt are, in fact, rather insignificant. As previously indicated, the Missouri River Division Engineer's report in H. Doc. No. 214 which recommended the 9 ft. project made no claim for erosion control benefits for the project. Nevertheless, five years after Congress authorized the 9 ft. project, the Missouri River Division Engineer increased his estimated cost for the 9 ft. project (by \$95,210,000) and presented an 84 page analysis of project benefits which indicated that 75% of the future benefits for the 9 ft. project would consist of erosion control

Mr. Gus J. Karabatsos
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CORPS OF ENGINEERS RESPONSES

benefits. Based on this ratio of erosion control benefits to total benefits, it is logical to assume that the immediate beneficiaries of erosion control benefits should contribute about 75% of the project cost. Perhaps it is just coincidental that the Secretary of War had previously approved the general principle that the local beneficiaries contribute 75% of the cost of the installations for which they would receive benefits.

During the period that local interests contributed towards the cost of constructing the prior 6 ft. navigation project between Kansas City and the mouth, a total of \$675,663 was collected of which \$8,647 was returned to the contributors. In contrast to this insignificant contribution, the Missouri River Division Engineer's report of July 28, 1950 claimed that the erosion control benefits during the construction of the 6 ft. project from 1912 until the 9 ft. project was authorized by Congress in 1945 were as follows:

Meander Belt	\$ 41,446,600
Landward of Meander Belt	28,400,000
Accretion Areas	5,259,850
High Valve Installations	58,600,000
TOTAL	\$133,706,450

If it is assumed that about one-half of these benefit are for the reach between Kansas City and the mouth, the local contribution amounted to almost exactly one penny for every \$100 of benefits to the local interest. Either the Corps was very lax in requiring the local beneficiaries to contribute towards the cost of the project or these erosion control benefits are largely fictitious. Based on the erosion control benefit analysis presented in the Jan. 1953 report of the Missouri Basin Survey Commission, one is forced to conclude that these benefits are, in fact, largely fictitious.

It is to be noted on page 6 of attachment #1 that the conclusions of the House Subcommittee on Army Civil Functions regarding their review of the project benefits in the Missouri River Division Engineer's July 28, 1950 report were as follows:

"It is apparent that the Corps of Engineers has treated the known facts with respect to this Missouri River project most lightly and, in some instances, recklessly. The committee is thoroughly dissatisfied with the Corps' performance, and feels that such substantial doubt has been cast upon the Corps' methods that their results are hardly worthy of credence."

It should be noted that local cooperation for bank erosion protection was not included in the authorizing document for the 9-foot channel project in 1945. Subsequent to the "Report on Missouri River Channel Stabilization Navigation Project, Sioux City to Mouth" of 1950, Congress was informed of the erosion control benefits attributed to the project and have been so informed on an annual basis to date. Furthermore, the Federal interest and local cooperation requirements have since been modified as discussed below. Federal interest in bank stabilization, except in serious cases affecting the general public welfare, is limited to measures required as components of flood control, navigation and other water resources developments. Costs of such components will be shared in accordance with the basic policies applicable to the project functions served.

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This was a committee staff effort which, as the document noted, circumscribed the opportunity for the Corps to explain their analytical effort or reply to the staff report.

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Mr. Gus J. Karabatsos
Page Eleven
July 15, 1976

Additional Information Needed in the EIS

It seems quite clear that insufficient information has been presented in the April 1976 Draft Environmental Statement to permit the reader to obtain a sufficient understanding of the project, its history and its impacts. While the Draft EIS states on page I that "For specific details of the information presented in the EIS, the reader is referred to the Task Force Group report and other pertinent publications listed in the Sources of Information (Bibliography) section", the reader is left with the rather impossible task of referring to a very long list of publications for the purpose of obtaining the necessary background information. A review of the list of publications in the Bibliography suggests that a considerable amount of material from references #6, #13, #14, #15, and #16 should be included in the environmental statement.

Appendix 1 of the Draft EIS presents a series of flow probability curves. There appears to be no discussion whatsoever of these curves in the Draft EIS. Information on the significance of these curves would seem appropriate. Section 4.02.1.6 states "A common, indirect, adverse effect of structure maintenance and construction is their contribution to increased flood stages of the river." This is a very important impact of the project and should be covered in considerable detail. Has any estimate of the economic impact of this effect been made? Limited information on the increased flood hazard is presented on page 6 of attachment #1 and on page 117 of attachment #3.

On pages I-6 and IV-6 it is stated that public notices regarding proposed dredging are issued under the provision of title 33 CFR Part 209.145. Have similar public notices been issued for the proposed channel improvement work?

Section 2.02.1.1 indicates that controlled releases from the main stem reservoirs are made for navigation in order that a flow of 30,000 to 35,000 cfs at Sioux City is maintained during the normal eight month navigation season. The additional reservoir storage needed to guarantee these flow rates can result in excessive reservoir storage during very wet years. This explains the section 2.02.1.1 statement "sustained discharges up to 55,000 cfs are maintained at Sioux City about one year in ten" (in order to take care of the excessive storage). The EIS should not only point out the relationship between these high flow rates and the added reservoir storage needed to guarantee navigation flow rates, it should also provide information on the various adverse effects from the high flow rates. These include increased bank erosion particularly below Gavins Point Dam, additional flooding, and the increased cost of maintaining the bank protection and river regulation structures.

Sincerely,

George E. Anderson

George E. Anderson

GEA/dao
Four Attachments

CORPS OF ENGINEERS RESPONSES

The essential background information from references 6, 13, 14, 15, and 16 has, in our opinion, been digested and incorporated into the appropriate sections of this statement. Copies of all these documents may be reviewed. These five references alone comprise a stack about two feet in height, and it would seem impracticable to incorporate into this statement a substantial portion of the raw data contained in them.

Concerning the flow probability curves presented in Exhibit 4, an explanation and discussion have been added to the text at paragraph 2.02.1.2. A discussion has been added at paragraph 4.02.1.6 on the effects of the navigation structure on river stages. It is explained that new structures height criteria have been adopted with the aim of avoiding future increases in river stage. We expect no further increases in flood stages caused by the remaining construction and continuing maintenance, which are the subject of this impact statement.

Yes, public notices have been issued by both the Omaha and Kansas City Districts announcing any new channel improvement work on the Missouri River.

The sustained higher releases from the reservoir system during wetter than normal years are required in order to evacuate the flood control storage in the system so that this storage will be available at the beginning of the next flood season. These releases to evacuate the flood control space incidentally serve the needs of navigation, power and other uses. Water is stored during the wet years in order to avoid downstream flooding, not because the navigation function has resulted in excessive reservoir storage. Information added to the text at paragraph 2.06.1 explains that the reservoir storage and release patterns would be about the same even if navigation were not a purpose of the main stem dam system.

AF
Missouri Chapter
of the
American Fisheries Society

CHARTERED MARCH 10, 1944
Route 9,
Hartsburg, Missouri 65039
June 18, 1976

Mr. Gus J. Karabatos, Chief
Planning Division
Missouri River Division, Corps of Engineers
P. O. Box 103, Downstream Station
Omaha, Nebraska 68101

Dear Mr. Karabatos:

The Missouri Chapter of the American Fisheries Society is pleased to have the opportunity to comment on the draft EIS for Continuing Construction and Operation and Maintenance of the Missouri River Bank Stabilization and Navigation Project.

We found the draft to contain much valuable information and agree with most of the facts that are presented. We are especially appreciative of Corps efforts to control or reduce environmental damages through "environmental notches" and studies to determine future mitigation measures.

A serious deficiency in the report is lack of directness in presenting a description showing the magnitude of fish and wildlife losses that already have occurred as a result of the project. Canalization of the Missouri River has probably resulted in more serious loss of aquatic habitat in Missouri than any project by any agency. Loss of water surface area alone is in excess of the largest Corps reservoir in the state, and as the report points out, the project area contains a high proportion of the human population. Thus, the loss of wildlife values have been especially significant. Illustration of such environmental changes would seem more applicable to an Environmental Impact Statement than the group of maps, for example, which do not add much to understanding of environmental impact effects. The six pages devoted to describing impacts and effects hardly seems appropriate for a project of this magnitude.

Attached are more detailed comments. We hope they will be helpful in improving this important report.

Sincerely,

James P. Fry
James P. Fry, Chairman
Environmental Impact Committee
Missouri Chapter, AFS

JPF:llm
Afh.

CORPS OF ENGINEERS RESPONSES

The subject of the EIS is the proposed Corps of Engineers action — that of the remaining construction and the maintenance of the project features after construction — and not the past Corps of Engineers actions. (see the Syllabus) The Corps of Engineers on-going fish and wildlife mitigation study is identified in this impact statement. The mitigation study is attempting to identify the adverse effects of the project's construction, and will present a plan of mitigation of these adverse effects.

COMPS OF ENGINEERS RESPONSES

1.07

Discussion of project economics is inadequate for a project of this size. What is considered the project life? At what time will project costs and project benefits achieve unity, considering current rates of inflation?

The proposed action is to complete the remaining portion of construction and maintenance of the project. In this respect, the estimated remaining construction costs and remaining benefits after FY-78 were examined using the current interest rate of 6-5/8%. This resulted in a Benefit/Cost Ratio of 1.4 to 1. A complete discussion of the project economics related to bank stabilization and navigation was the subject of Appendix III, Benefits, Report on the Missouri River Channel Stabilization and Navigation Project, Sioux City to Mouth, 28 July 1950. The project life was established to be 100 years. Since this report, bank stabilization benefits have been revised to accommodate increased capital investment, agricultural production and prices. Navigation benefits have been reduced slightly. The Flood Control Act of 1962 authorized inclusion of recreation as a project purpose. After recreation benefits were added in 1967 they have remained unchanged. Costs have been added to the project as they accrue through funding by Congress. Operation and maintenance costs have been updated according to experience. Despite these changes the Benefit/Cost Ratio today remains the same as it was in the 1950 report.

2

2.03.6

We disagree that "the rock substrate (dikes) offers several ecological advantages". The standing crop figures you quote bear out this discrepancy. Eddies created by rocks in no way compensate for or replace large quiet ecological zones lost because of the project. No doubt some species find rocky areas desirable, but this is not the type of habitat most native species are best adapted for.

The immediate water area and associated interfaces around dikes offer as diverse aquatic habitat as any of the major divisions of the river ecosystem -- main channel, dike areas, chutes and sloughs adjoining the main channel, and tributary confluences. The dike areas provide uneven rock/water interfaces causing water movement sufficiently slow to permit fish and other nektonic organisms movement. The rock is a stable base for a diverse community. The relatively stable mud/silt bottom associated with the dikes is acceptable substrate for the development and maintenance of benthic communities. Crayfish in the rock dikes serve as resting and nursery areas for certain species of fish found in the river. While the mud/silt bottom does not typically produce the benthic standing crop that chutes and sloughs produce, it does produce a substantially larger standing crop of benthos than the river channel. The dike habitat type does offer the diversity of habitat needs of many biological specimens found in the river.

3

2.04.6.1

We strongly disagree that commercial river traffic does not adversely affect recreational boating, and cannot conceive how you arrived at the idea that passing towboats add a pleasing "backdrop" to recreational boaters. On the contrary, we believe the threat of being capitalized by a tow wake keeps many recreationists off the river.

The impact statement makes the point that the towboat wake can be hazardous to boaters. This is particularly true for the pleasure boaters who do not adhere to the rules of safe boating relative to meeting or passing other craft.

4

CORPS OF ENGINEERS RESPONSES

Typically, at the beginning of the fall waterfowl hunting season, water released from Gavins Point Dam is about 30,000 cubic feet per second, or adequate to accommodate river navigation. Usually during the waterfowl hunting season the navigation season comes to a close and water released from Gavins Point Dam is reduced. The lowered river stage leaves many decoy setups "high and dry". It is not usual for the river stages to be increased during the waterfowl hunting season submerging sand bars or causing deep water in shallow chutes.

The Corps of Engineers participation in recreation development associated with the project is authorized by the Flood Control Act of 1944, as amended. This Act does not permit land acquisition for recreational purposes. The Corps development of recreation facilities, therefore, is on lands furnished by public entity sponsors and dedicated for recreation purposes. Sponsors, besides obtaining the lands for recreation development, must also assume the operation, maintenance and replacement responsibilities. These fiscal and legal requirements of sponsors greatly influence the amount and location of Corps of Engineers shared recreation development on the river. The suggestion that the 3.5 million people residing in the area adjacent to the project have not benefited in terms of employment and income is erroneous. Erosion of banks and levees has been significantly reduced thereby effectively increasing acres of land, productive capacity, and minimizing damage to capital improvements. This has significantly enhanced the agricultural productivity on adjacent lands, and resultant income and multiplier effect on employment. Operation of the navigation project has reduced the cost of shipping products to and from the area, thereby directly increasing the income of the residents.

The losses of fish and wildlife and their habitat occasioned by the construction of the bank stabilization and navigation project and a plan formulated to mitigate the losses is the subject of a separate study.

The curback in releases in fall are less disruptive to hunting than high flows, which submerge desirable sandbars.

The relative scarcity of public access to the Missouri River reflects the popularity of the Corps cost-sharing access development program. We believe the Corps of Engineers should be responsible for providing reasonably spaced public access areas in the project area at Federal expense, to compensate in part for the significant loss of recreation resulting from the project. The 3.5 million people residing in counties adjacent to the project appear not to have benefited from the project in terms of employment or income (Section 2.04) and in addition have lost much of their recreational opportunities.

If a rift race is worthy of an entire paragraph in this report, we believe a thorough discussion of project caused wildlife habitat loss is worthy of more complete discussion. How many acres of aquatic and terrestrial habitats have been lost, directly and indirectly, because of the project? How does this compare with the resource base in the various states?

CORPS OF ENGINEERS RESPONSES

4.02.1.1

How much of the accreted land is actually on tax rolls? How much tax is generated? The report should include a discussion of the loss of this land from public ownership.

8

Land that is accreted is gradually brought into various uses. Just when this land is entered on the tax rolls would be at the discretion of the local taxing jurisdiction. To determine when and how much of this new land is actually on the tax rolls, would require an extensive, costly survey. More important than adding new land to the tax rolls would be the stabilization of banks subject to erosion, thereby retaining productive land on the tax rolls.

4.02.1.4

We do not understand your basis for use of the words "direct" and "indirect" effects throughout the report. Reduction of habitat surely is a very direct way of reducing wildlife populations.

9

Direct effects are those effects caused by Corps construction or maintenance actions. Indirect effects are those effects caused by other-than-Corps actions with, however, the Corps action being the incentive for the other-than-Corps actions. Agree, that reduction of wildlife habitat is a direct way of harming wildlife.

4.02.2.2

Riparian landowners and local governments are also adversely affected by increased river stage heights resulting from the project. We wonder how the increased tax revenues compare with costs of increased flood protection needed because of the increased stages.

10

The increased river stages have been minimal and resulted in a negligible effect on flood protection works and needs.

4.02.2.2

What information is available to show that fish do not use snags in the main channel? This view is contrary to any literature we have seen. It seems more likely that snags are especially important in main channel habitat where cover is otherwise very limited.

11

Agree that river snags usually provide desirable habitat for river fish; see paragraph 4.02.1.8.

4.02.4.1

We feel your comment regarding the energy efficiency of barge and towboat transportation should be qualified, and documented. As you know, some studies have not been in agreement with your statement. The railroads claim they are more energy efficient. Has the energy used for constructing and maintaining the navigation channel been included in your studies?

12

Generally, goods that are moved by inland waterway are of low value, high in volume, moved between points amenable to the system, and time is not a critical consideration. That the barge is a more efficient user of fuel per ton-mile is generally accepted. This was illustrated by a study done for the Federal Railroad Administration in 1973 by Iowa State University which arrived at the estimated gallons of fuel per ton/mile: barge - 0.002, rail - 0.003, and truck - 0.021. The costs of energy expended for construction and maintenance of the navigation channel is included in the average annual cost of the project.

4.02.4.2

Again we take exception to your view regarding effects of towboat traffic on recreation. More important, this report does not address the more critical problem of effects of the project, in total, on recreational resources.

13

See response number 4 and 5.

4.02.6

Several adverse effects are not listed:

1. increased river stage heights, resulting in more costly flood control
2. reduced floodway capacity
3. reduced public domain
4. reduced recreational base
5. reduced bottomland forest products base
6. destruction of aesthetic values including loss of undisturbed river bluffs by quarry operations.

14

Increased flood stages were addressed in the text (see paragraph 4.02.6.7). Reduced floodway capacity is recognized in paragraph 4.02.1.6. The remaining construction and continued maintenance of structures will not lead to a reduction of land, whether it will be a loss of public domain is a matter of State law. The remaining construction and continued maintenance is not expected to reduce the existing recreational base of the river. Land use of the bottomland is outside of the authority of the Corps of Engineers. Quarried rock will be used in the construction and maintenance of dikes, sills and revetments. However, the source of this construction material, it is believed, will be existing quarries and not undisturbed river bluffs.

CORPS OF ENGINEERS RESPONSES

6.01.1

We disagree with the flat statement that discontinuation of navigation would result in the loss of economic benefits associated with Missouri River transportation. If the Federal Government subsidized rail maintenance to the extent they do navigation channel maintenance, the net result might be a savings in transportation costs. Are data available to indicate the costs of continuing navigation, as opposed to other transportation modes? How would waterway user charges affect the economics of commercial navigation?

15

The American Waterways Operators make the statement that the waterways "moves about 16 percent of the Nation's freight for about two percent of the freight bill." This statement perhaps falls far short of implying how much greater the national freight bill might be without lower water-compelled rates, since an undetermined amount of goods are moved by other carriers using water-compelled rates. In a study presented by the AWO comparing railroad charges per ton of grain over similar distances from different sources to a common destination, non-water-competitive rail rates were 150 to 259 percent of water-competitive rail rates. Although this information was presented in 1967, it is generally believed that rate increases have exceeded water rate increases since that time. This would lend credence to claims that discontinuation of the navigation project would mean increased transportation costs to shippers and related business who now use the waterways as well as those who use transportation where water-compelled rates are in force. The net effect of imposing a waterway user charge would be that these costs would be passed on to the users.

7.01

We disagree that the project produces net recreational benefits.

16

Potential recreation benefits were first considered in 1964. They will contribute to meeting some of the unmet recreational demands for water-oriented activities presented in Statewide Comprehensive Outdoor Recreation Plans (SCORP's). These are additional benefits that will be realized as planned recreational features are added to the project.

A
F
S

Missouri Chapter
of the
American Fisheries Society

CHARTERED MARCH 10, 1964

Route #1, Box 153
Holt's Summit, Missouri 65043
May 14, 1976



THE AMERICAN WATERWAYS OPERATORS, INC.

WASHINGTON DISTRICT OFFICE
1600 WILSON BOULEVARD • SUITE 1101 • ARLINGTON, VA 22209

JAMES R. SMITH, President

Telephone: 703-641-0200
TWX 710-955-0217

CORPS OF ENGINEERS RESPONSES

May 26, 1976

Dear Mr. [Signature]:

This will respond to the Draft Environmental Statement for the Missouri River Bank Stabilization-Navigation Project, dated April 1976.

The American Waterways Operators, Inc. is the national trade association for the barge and towing industry. A majority of the members of AWO are carriers engaged in the transportation of commodities by water. These include carriers regulated by the Interstate Commerce Commission, carriers exempted from ICC regulation, and private carriers. In addition, AWO has as members shipyards, terminals, midstream fuel and supply services and others directly related to the barge and towing industry.

AWO fully supports the Missouri River Bank Stabilization-Navigation Project and the Draft Environmental Statement associated with the project as consistent with the present and projected growth requirements of the water carrier industry.

The contributions made by the barge and towing industry in meeting the nation's transportation needs are significant. Its inherent advantages are demonstrated annually both in terms of tonnage moved and the economic, energy and safety efficiencies exercised in the movement of this tonnage.

The Missouri River, for example, moved 5,841,930 commercial tons alone in 1974, compared with 4,719,597 commercial tons in 1965, an increase of nearly 24% in a decade. In addition to the 5.8 million commercial tons moved in 1974, there were 1.8 million tons of waterway improvement material moved, for a total of 7,673,084 total tons. Major commodities which comprise this tonnage are sand, gravel and crushed rock, wheat, corn, soybeans, fertilizer, building cement, and distillate fuel oil. All these commodities are necessary to the basic economic activity of the United States.

The waterways move these vital commodities safely, with minimum energy use, and at extremely low cost. This industry moves about 16% of the nation's freight for about two percent of the freight bill.

In terms of products moved, nearly 60% of total tonnage on the waterways consists of "fuel for others". By all projections, the barge and towing industry will be hauling ever-increasing amounts of coal, chemicals, grains

Your comment is acknowledged.

Missouri River Passenger Excursions Inc.

3602 SHERWOOD DRIVE
OMAHA, NEBRASKA 68147
PHONE: (402) 733-5473



CORPS OF ENGINEERS RESPONSES

May 18, 1976

Department of the Army
Missouri River Division, Corps of Engineers
P. O. Box 103, Downtown Station
Omaha, Nebraska 68101

Attention: Gus Karabatsos, Chief, Planning Division

Re: Draft Environmental Statement for the Missouri River Bank
Stabilization-Navigation Project

Gentlemen:

I find no effect of the continuance of the Corps of Engineers' maintenance - a progressive action toward the stabilization of the Missouri River waterway.

Also, the continuance of the Corps of Engineers actions, in this respect, are in the best interests of the taxpayers through flood control, decreased costs of the national product and should be financed through the tax split off received by the Federal Government.

To require new configuration of tow boats and barges by private industry will necessitate a passed-on increase to the ultimate consumer, the general public of the USA, and will overshadow that small amount of the tax dollar required by this program.

Yours very truly,

MISSOURI RIVER PASSENGER EXCURSIONS INC.

E. F. Wolf
E. F. Wolf
Secretary-Treasurer

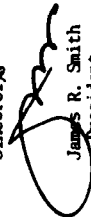
Your comment is acknowledged.

- 2 -

and other raw materials of production in the coming decades. Projects such as the Missouri River Bank Stabilization-Navigation Project will enable the barge and towing industry to meet the demand placed on it by the shipping community.

The growth and viability of the water carrier industry depends upon a well-maintained, reliable system of navigable river channels to continue its vital role in moving a large percentage of the nation's commerce. AMO fully supports the early adoption of projects consistent with both the present and projected growth of the barge and towing industry.

Sincerely,


James R. Smith
President

Mr. Gus J. Karabatsos
Chief, Planning Division
Missouri River Division
Corps of Engineers
P. O. Box 103, Downtown Station
Omaha, Nebraska 68101

JRS:nds

Thomas A. Milne
Quivira Lake
Kansas City
Kansas 64106

June 14, 1976

Mr. Gus J. Karabatsos,
Missouri River Planning Division Chief,
Corps of Engineers,
P.O. Box 103, Downtown Station
Omaha, Nebraska 68101

Dear Mr. Karabatsos:

I have completed a review of the Draft Environmental Statement for the Missouri River Bank Stabilization-Navigation Project (Sioux City to the Mouth).

This DEIS appears to be totally inadequate as a basis for a Final EIS. The following major deficiencies and omissions are noted:

1. The benefit-cost ratio is incomplete.
2. The effect of increased flood stages is not presented.
3. The recreational uses of the river without the project are not adequately treated.
4. The aesthetic effects of the project are not meaningfully addressed.
5. The future loss of river flow due to Great Plains energy development is not discussed.
6. The effect of the project on railroads is not presented and evaluated.
7. Illogical and inappropriate benefits are claimed in the environmental impact section. Project goals, economics and environmental costs and benefits are confused.
8. Sources of information are not cited throughout the report.
9. Alternatives are not discussed in meaningful detail.

Detailed section-by-section comments are attached as an Appendix. It appears significant that the Mid America Regional Council and the Overts Regional Commission are undertaking a study of the slow pace of barge traffic in the Kansas City area, with the expressed concern: "about whether the Corps of Engineers could justify continuing its Missouri River channel stabilization project, which calls for construction and maintenance of a 9-foot channel from Sioux City through Kansas City to St. Louis." Another concern expressed was that: "Some fear that upstream diversions such as irrigation and coal gasification might not leave enough water for future barge traffic." (Quoted from Referec, June, 1976.) The DEIS as it stands does not provide the information to answer these and similar concerns.

In summary, the DEIS is the kind of superficial, pro-forma statement that does little justice to NEPA. It is suggested that the DEIS be extensively revised so that the public may make an informed judgement as to whether the one half billion dollars has been justifiable spent, whether future project costs are beneficial and whether preferable alternatives to the project exist.

cc. to Friends of the Earth, Sierra Club,
EPA, RFP, NRDC, Mo. Dept. of Conserv.,
Kansas Fish Game.

Sincerely,

Thomas A. Milne
Thomas A. Milne
Friends of the Earth,
Quivira Lake, Kansas City, KS. 66106

Appendix attached.

IX-77

CORPS OF ENGINEERS RESPONSES

Your comments and conclusions are noted.

Specific responses are made to your section-by-section comments on the following pages.

APPENDIX

Specific Comments and Questions. Draft Environmental Statement for the Missouri River Bank Stabilization-Navigation Project.

Page 1 This Comment statement should not be allowed to substitute for the presentation of sufficient facts in the EIS to support the conclusions drawn, nor should it replace detailed references to specific, available reports.

Sec. 1.05 \$5 out of how many? Give as a % completion.

Sec. 1.06 Since the COE contributes so little, relatively speaking, to the recreation sites, the recreation benefits claimed for these sites should be pro-rated between the bearers of costs.

Sec. 1.07 Either here or in a later section the economic effects on railroads should be mentioned. In the benefit-cost ratio breakdown:

- Bank stabilization benefits should be broken down by agriculture, urban and industrial categories.
- The type of recreational benefits should be described since the remainder of the DEIS seems to imply a net loss in recreational benefits of all kinds. Is the 1.4 million dollars/year a "net" benefit or only the benefit from the project access sites. (See comment on Section 1.06)

Under average annual costs:

- Maintenance costs for bank stabilization and navigation should be separately listed since in discussing alternative actions it is pointed out that the bank stabilization portion of the project could proceed without the navigation portion and since the project benefits are almost entirely due to bank stabilization.

CORPS OF ENGINEERS RESPONSES

The purpose of the "Comment" statement in the draft EIS was to convey information to the readers that the EIS was scoped as a summary statement principally of the various decision documents, listed for the convenience of the reader, and the data document assembled by the Missouri River Division Task Force entitled "Missouri River Bank Stabilization and Navigation Project." The statement has been removed from the Final EIS.

Sixty-seven; however, the plan for recreation development is currently being evaluated. Should the evaluation show the initial development plan to be inadequate the plan will be reformulated.

Recreation is an added function to be accommodated by the project under the general authority of Section 207 of the Flood Control Act of 1962. Annual recreation benefits, based on the value of recreation assigned by Senate Document 97, are greater than the annual investment and operations and maintenance costs. Therefore, the recreation investment is well justified. Although an allocation of benefits to Federal and non-Federal investors could be accomplished, the results would be of little value.

The stabilization project has for the most part eliminated the need for expenditures for the protection of installations including levees from erosion or threats of erosion. Some of the works constructed to protect high-value installations also protect some agricultural land. Nearly 60 percent of the stabilization project benefits are agricultural. Recreation benefits are those associated with the development of planned river access points without consideration of the amount of recreation that may have existed on the river prior to the development of the project.

The project features for bank stabilization and navigation are interrelated. That is to say, where the bank is stabilized, erosion of the bank is minimized and sediment does not contribute to the build-up of navigation hazards. Likewise, where training dikes are in place for the navigation channel they direct the current away from the banks that otherwise would be eroded. It would be difficult to separate maintenance costs between navigation and bank stabilization features, due to the interrelated functions of each type of feature, as described above. The dual benefits associated with the individual features have not been separated; only the cumulative of each type of benefit has been estimated.

CORPS OF ENGINEERS RESPONSES

b. The average annual cost of increased flood stages on the lower river must be included in cost estimates since it is an acknowledged effect of the project.

c. A cost should be included for the loss in natural river environment based on its aesthetic value and recreation use and attraction. An analysis similar to that of Fleener in his Missouri Conservation Dept. report on the Platte should be attempted. (Study 3-14, Job No. 1. Recreational Use of the Platte River. George G. Fleener, Project Leader. July 1, 1972).

d. Although I understand the law allows the use of the completely unrealistic interest rate of 24 % in testing whether the project has a cost-benefit ratio less than one (however fictitious this makes the number), it would seem appropriate in Section 1.07 to state project costs if current, realistic rates of interest were used. This would be in keeping with the Corps professed interest in meaningful dialogue with, and input from, private citizens, who would like to know the true project cost-benefit ratio as well as the legally sufficient, artificial ratio.

Sec. 1.09.5 It is stated that the need for dredging will diminish as completed project continues. Will this be true as river flows decrease due to greatly increased use of Missouri River basin water for energy development in the Great Plains?

Sec. 1.10.11 It is stated here that permanently secured river banks were necessary before the levee system could be constructed. Later it is stated that with cessation of the project, levees would simply be moved farther back from the current river channel. Isn't the placement of levees just part of the economic optimization of flood plain use? Did the bank-stabilization benefit figure presume no levees without the project?

The average annual costs of any increased flood stages have not been included in project cost estimate. The principle cause of increased flood stages has been flood plain encroachments by levees and other developments rather than the river structures constructed as a part of the Bank Stabilization and Navigation Project.

The subject of this report is to consider the remaining construction and maintenance of the project. In this respect we have recently examined the estimated remaining costs and remaining benefits after FY-78 at the current interest rate of 6-5/8%. This resulted in a Benefit/Cost Ratio of 1.4 to 1.

The Fleener report on the Platte River (Missouri) is not comparable since it is impossible to measure at this time what the pre-project aesthetic value and recreation use may have been.

No, requirements for dredging may increase if river flows significantly decrease. See also paragraph 2.05.

Many private levees were constructed before project bank stabilization features were in place. Without these features the levees were subject to erosion and consequent failure. If the maintenance of project structures (proposed actions) were not continued many of these levees would likely be moved back if they were threatened with erosion or failed, thus providing protection to a much smaller acreage. Economic analysis of the bank protection features is independent of the analysis of the Missouri River Levee System. The Federal levees are assessed as a last added flood control feature assuming the bank stabilization features are in place and completely functional. Placement of Federal levees are set back from the river to preserve an adequate floodway.

CORPS OF ENGINEERS RESPONSES

Sec. 2.02.1.1 What are the projected non-flood flows when full scale energy development begins in the Great Plains?

11

See paragraph 2.05 for discussion of river setting with projected future water depletions. A minimum requirement at Kansas City has been determined to be approximately 6,000 cfs for human health and safety.

Sec. 2.04.5.2 The effect of the project on the twelve major rail lines serving the US-county Missouri River Project area should be discussed throughout this DEIS.

12

The effect of the proposed Federal action (that is, the remaining construction and annual maintenance of river stabilization and navigation structures) is not expected to significantly alter the existing business of the 12 major rail lines serving the 45-county project area.

Sec. 2.04.5.6 How many ton-miles/year on the project portion of the river? What is the justification for expecting barge traffic to rise in view of recent concern about lack of growth in traffic levels and in view of future low flows in the river due to increased water use? The projected usage for the project life should be given and justified.

13

In 1976 nearly 1,536 million ton-miles moved on the Missouri River. Of the 5.96 million tons moved, about 2.86 million tons were sand-gravel-crushed rock, and 0.58 million tons were waterway improvement materials. If the average movement of sand-gravel-crushed rock were 1.5 miles this would account for about 4.3 million ton-miles. The waterway improvement materials would represent about 10.4 million ton-miles with an average movement of 18 miles per ton. The total ton-miles of commercial movement in 1976 would still be approximately 1.52 billion. Commercial traffic, excluding sand-gravel-crushed rock and waterway improvement materials first exceeded 2 million tons in 1965 and reached 3.1 million tons in 1976 and nearly 3.3 million tons in 1977. Both upstream and downstream traffic are highly oriented to agricultural production, grains exported from the region and agricultural inputs imported. Future traffic is sensitive to a number of variables: world grain production responding to growing foreign markets, energy costs, efficiency of transportation modes, waterway user charges and other factors. The agricultural production efficiency of the region would lend itself to increased demands for waterway use, anticipated to reach 5.0 million tons ultimately.

Sec. 2.04.6 The Fleener report (see above) should be cited here. The statement in this section and 2.04.6.1 seem to contradict the assignment of net recreational benefits to the project. The recreational losses should be quantified.

14

Potential recreation benefits were first considered in 1964. There are additional benefits that will be realized as planned recreational features are added to the project. Quantification of recreational use of the river before initiation of project construction is unavailable. The Fleener report referred to relates to the Platte River in Missouri. The Platte River referred to in the text enters the Missouri River in Nebraska.

CORPS OF ENGINEERS RESPONSES

Sec. 2.04.6.3 Data on relative frequency of use of "un controlled" river vs. "controlled" river at Sioux City marina would perhaps provide one index of recreational loss caused by the project, and should be cited.

15

Users of the Sioux City marinas have not been questioned specifically about the frequency of use they make of the river in the navigation reach of the river or their use of the river above Sioux City. The river between Sioux City and Ponca State Park, Nebraska (above the navigation reach) has been stabilized. General observation indicates that many boaters use the river to travel to the state park, and many use the river to gain access to sand areas accreted by the bank stabilization structures and the regionally unique sand dune area on the river south of Elk Point, South Dakota. Because of these special aspects of the river's attractiveness upstream of Sioux City, the comparative frequency of use of the river in the project reach and upstream would not be a valid index of recreational loss caused by the project.

Sec. 2.04.7 What is the role of the project in the decline of commercial fishing and what are the economic and social dis-benefits? These losses should be included in the benefit-cost ratio.

16

Please refer to our response number 10 to EPA's similar comment.

Sec. 2.05 This section implies that for agricultural use, true benefit-cost ratios are perceived as less than unity by private landholders. High value areas would be protected by local entities even without the project. This casts doubt as to the validity of the large benefit claimed for bank stabilization, unless it is dominated by critical, high-value areas. (See earlier comment on need for a breakdown of benefit numbers).

17

The life of the project is 100 years; therefore, it is problematical whether present landholders in agricultural areas could justify expenditures providing the present level of protection over their relatively short tenure. Without a well-conceived, broad-based program to protect all vulnerable areas, it is likely that some unstabilized areas would lead to the rapid debilitation of adjacent stabilized areas. In addition, agricultural and related interests would not benefit from lower transportation rates compelled by the waterway.

Sec. 4.02.1.1 In this section the conclusions and methods of the Plesner report, adapted to the Missouri river, should be addressed. How serious an adverse effect is such stream-side use loss? Are any future river-side uses foreclosed?

18

The subject of this EIS (remaining construction and maintenance of the project) is limited in scope, making environmental assessments of the proposed action against the present river setting. In this context, present-day recreationists are attracted to developed recreation sites to use the facilities, and to dikes and revetments (some more than others, some are never visited) for fishing as they serve as fish "attractors" (structures to fishermen). There is a chance that this recreational attribute would be lost and their uses foreclosed if the maintenance of the project were suspended.

CORPS OF ENGINEERS RESPONSES

In assessing losses from stream bank erosion, it was recognized that over the years the bank-cutting erosional processes going on in some locations in a meandering, uncontrolled river are roughly in balance with bank-building depositional processes in other locations. Although there may not be a net loss of land in a certain stretch of river valley over a period of years, a certain portion of the valley land is continually in transition — from high flood plain land to river channel, due to the bank-cutting process; and from river channel to high valley land, due to the bank-building process. This period of transition was characteristically several decades on the Missouri River in its natural state. After high lands are reformed, considerable cost for grading and clearing would be necessary before the land could be prepared for farming. The annual acreage lost from bank erosion, the time-lag for high land to reform, the cost of grading and clearing, and the potential net income from developed land are all considered in assessing the "net" economic losses from bank erosion in natural, uncontrolled rivers.

19

Sec. 4.02.1.1.3 If project dikes cause accretion of land that can be used for agriculture, then does the normal meandering of the uncontrolled river do likewise? Is this considered when assessing "net" stream bank losses?

Sec. 4.02.1.1.5 The claimed beneficial effect of using quarry rock material, in that it is necessary to achieve the authorized project purposes, seems like a distracting, circular argument. Presumably every impact listed, except #5, is necessary for project purposes. It obscures the weighing of environmental effects of the project to state, in effect, that a project activity has a beneficial effect because it is necessary for the project.

20

Environmental effects expected are identified in the same paragraph.

Sec. 4.02.1.1.6 This section is grossly inadequate. The failure to assess the magnitude of the adverse effects of increased flood stage, both environmentally and in the benefit-cost ratio, would seem to be a violation of the intent of WPA. Recent studies of enhanced flood stage effects should be cited (eg. Science, 29 August, 1975, p. 611.) The dollar losses due to increased flood stages should be quantified in a manner consistent with flood stage benefits claimed for reservoirs, considering the whole downstream Missouri and Mississippi system likely to be affected. As an example, benefits were claimed for a single small tributary reservoir (Grove on a tributary of the Kaw) for lowering flood stages on both the Missouri and Mississippi.

21

Paragraph 4.02.1.6 has been revised. Dollar losses, however, have not been assigned to this effect.

Sec. 4.02.1.1.7 This section is likewise totally inadequate. It is the Corps responsibility to make a judgement of the net aesthetic effects of the project, citing references to studies of the value people place on pristine rivers. To say that completely altering the pristine river to a highly controlled, channelized stream being confined to a sinuous, artificial channel has an aesthetic effect that is "beneficial or adverse depending on one's point of view" is a copout. (Some people find beauty in the rainbow colors of an oil slick but few would fail to properly assess the overall aesthetic impact of an oil spill.) Since much of the controversy about projects like this has to do with aesthetics versus economics, this section should be greatly expanded.

22

The aesthetic effects (whether viewed as beneficial or adverse) of the maintenance of the existing structures and the structures remaining to be constructed are insignificant relative to the present day aesthetic setting of the river.

COMPS OF ENGINEERS RESPONSES

<p><u>Sec. 4.02.2.1</u> This is not an environmental effect, but rather a project goal. (See remarks in 4.02.1.5)</p>	23	<p>The project goal is to attain and maintain a 9-foot deep channel, 300 feet wide.</p>
<p><u>Sec. 4.02.3.1</u> The logic of the claimed benefit seems wrong. You are claiming it is a benefit to deposit the dredge spoil within the navigational servitude limits, since depositing it on adjoining private land is avoided! One is really speaking of lessening adverse effects in these two options, not achieving a true benefit in either case. The Corps seems to be forcing "benefits" to counter the very real losses also discussed. Will heavy metal or toxic organic dredge pollutants increase as full scale coal development occurs in the watershed?</p>	24	<p>We agree that redepositing dredge spoil within the channel might be not so much a "direct, beneficial effect" as it is an effort to lessen significant environmental effects. The subject is expanded in paragraph 4.02.7.2.</p>
<p><u>Sec. 4.02.4.1</u> Once again, in a supposed discussion of environmental effects of the project, the ultimate project use is cited as a benefit. Any argument for an energy conservation benefit should assess the total energy requirements of the project plus alternate transportation modes, including the energy used for dredging, quarrying and transportation of rock, etc. It is not clear on the face of it that a net energy benefit is being achieved at present or projected river use by barges.</p>	25	<p>The monetary benefits to the barge line shippers and local communities are measurable. The statement about waterway transportation being very energy-efficient is a general comment without intending reference to the net energy efficiency of the bank stabilization and navigation project.</p>
<p><u>4.02.5.1</u> Is there a public law guarding archeological or historical resources from quarrying for project purposes, analogous to P. L. 93-291 for recreational development?</p>	26	<p>PL 93-291 is not restricted to recreation development but applies to all activities that are integral parts of the Federal action. With respect to quarrying, however, the Corps of Engineers (or its contractor) is merely one of many customers at privately owned quarries.</p>
<p><u>4.02.6</u> In the summary of significant effects, all the beneficial effects cited are non-environmental, with some of the adverse non-environmental effects noted. Again, the whole summary is distorted by including achievement of project goals with effects of project activities.</p>	27	<p>Your comment is noted.</p>
<p><u>Sec. 4.02.7.1</u> The final EIS should include the results of this new study, in view of the acknowledged lack of quantitative data on fish and wildlife impact in this draft statement.</p>	28	<p>The results of the mitigation study will comprise a feasibility report probably summarized in a report impact statement. Public meetings were held in March 1977 and formulation is continuing.</p>
<p><u>Sec. 6.01</u> Breakdown of benefit-cost ratio of this project by function would allow a meaningful evaluation of these alternative programs.</p>	29	<p>Please refer to our response number 5 to your earlier comment on separation of cost by function.</p>

CORPS OF ENGINEERS RESPONSES

Sec. 6.03 Why are shallow drafted towboats and barges not presently available on the Mississippi basin Inland Waterway System? In view of major controversy over a deeper channel in the Mississippi, and to provide a meaningful assessment of the alternatives for the Missouri, economic and engineering assessment of this shallow-draft equipment alternative should be included.

30

Text has been revised, please see paragraph 6.04.

Sec. 7.01 Dis-benefits to railroads should be mentioned here.

31

The proposed action is to complete the remaining portion of construction and maintenance of the project. There will be negligible dis-benefits to the railroads by this proposed action.

Sec. 7.03 What does lack of flooding and meandering do to the long-term productivity of the flood-plain soil? What is the balance in long-term productivity of the Missouri river water as between energy and agriculture consumption and use for navigational flow? The long-term productivity of the uncontrolled river in providing recreational and aesthetic experiences to urban man should be included in this discussion.

32

The changing agricultural practices occurring on the flood plain -- that is, irrigation to control amounts of water to best accommodate specific crops and application of agricultural chemicals to achieve peak crop production -- makes protection of flood plain land from erosion necessary to assure the long-term productivity capabilities of the land. The reduction of flood flows achieved by the main stem dams and major tributary dams, coupled with streamside levees, significantly reduces flooding of the agricultural lands. Therefore, the projects are integrated to achieve a common benefit. Paragraph 2.05 describes future water conditions which can be expected under conditions of projected future depletions. The Ad Hoc Committee recognized irrigation use in the upper basin as being the major depletor. Navigation downstream from Sioux City would remain practicable beyond year 2020. There is not a single point of view by urban man concerning his aesthetic perception of the Missouri River in the project reach. One who is very sensitive of the beauties of rivers in their natural setting would probably feel indifference to the practicality of the stabilized, navigable Missouri River. Conversely, other urbanites incorporate their knowledge of the stabilized river banks and navigable channel as a part of their security when viewing, thinking or using the Missouri River riverscape. Powerboating occurs on the river; camping and picnicking occur on the river shore at developed areas. Sport fishing occurs in the river, today mainly in close association with the navigation and stabilization structures. It is expected that all of these recreation activities will continue to be available to the public in the future.

CORPS OF ENGINEERS RESPONSES

Sec. 3.01 Why cannot "the pristine river with its abundant and varied aquatic habitats, its riverine vegetation, and its bottomland woods" be returned in the long run if society so desires?

33

The scenario of Section VIII uses "riverine" as referring to volunteer, native vegetation from the river through the first terrace. It is agreed that a reasonable facsimile of the ecosystem that existed in earlier times could be returned, but the pristine ecosystem, in our judgment, is indeed irretrievable.

Sources of Information References to these sources should be made throughout the Statement. Sources of data on flood damage and increased flood stages, stream-side recreation, aesthetic value of pristine rivers, Great Plains energy development implications for river flow and water quality, should be added and referenced.

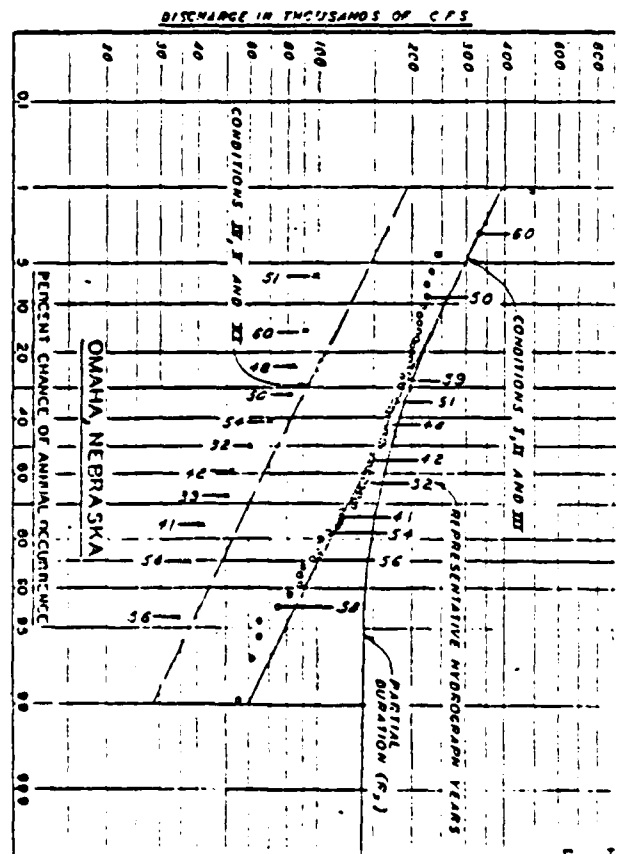
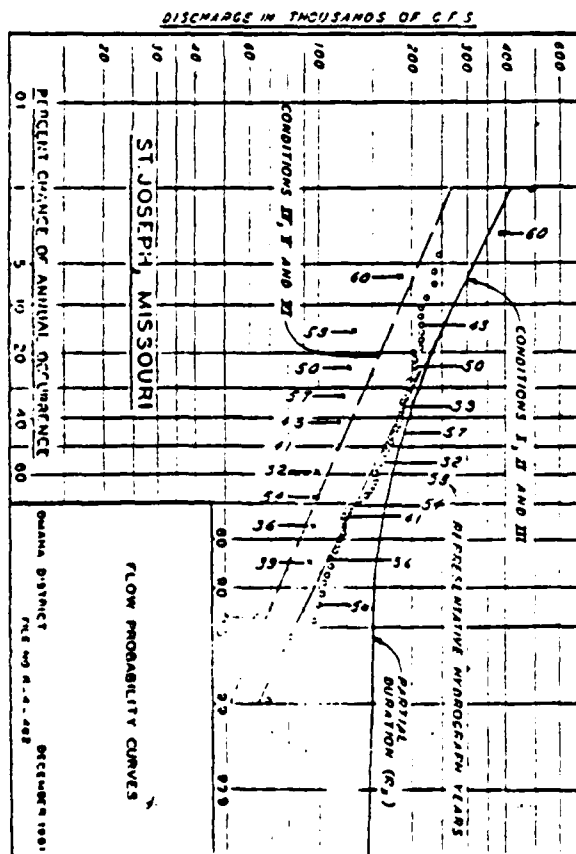
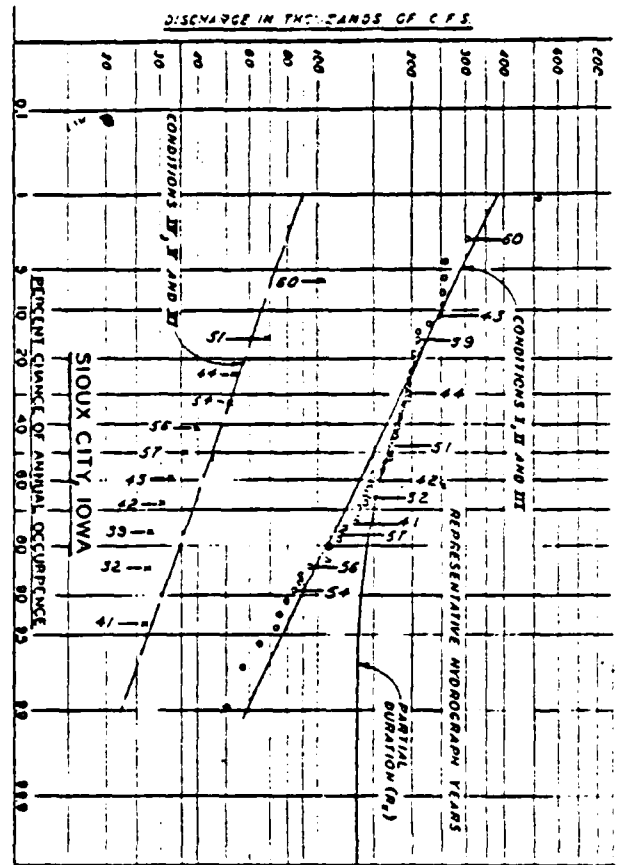
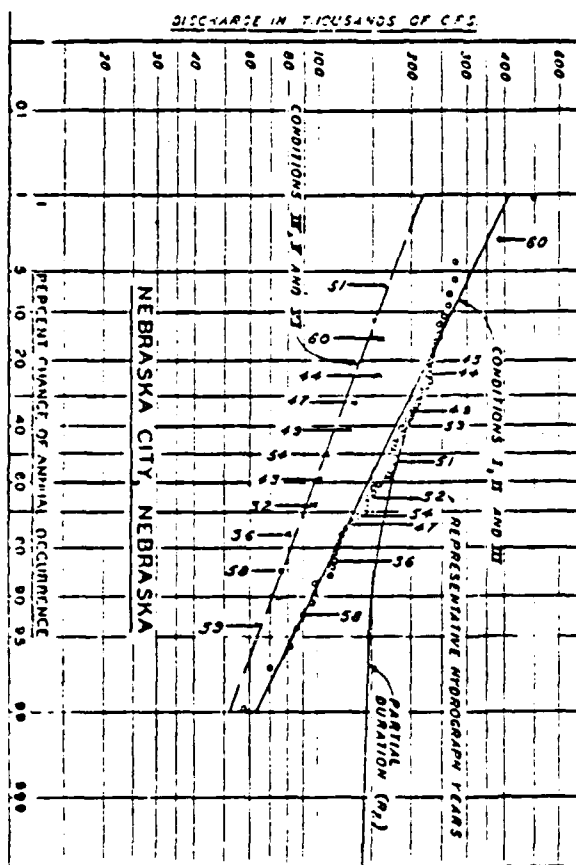
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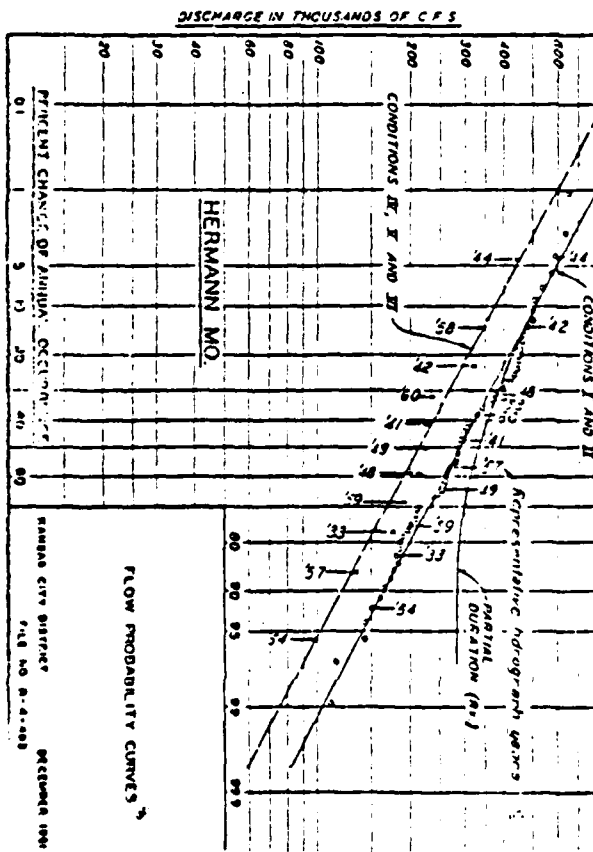
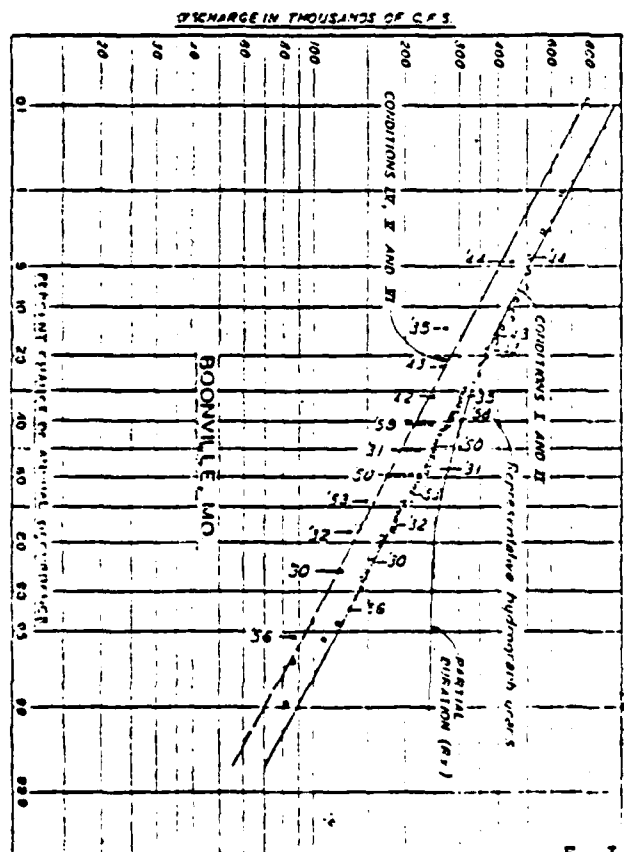
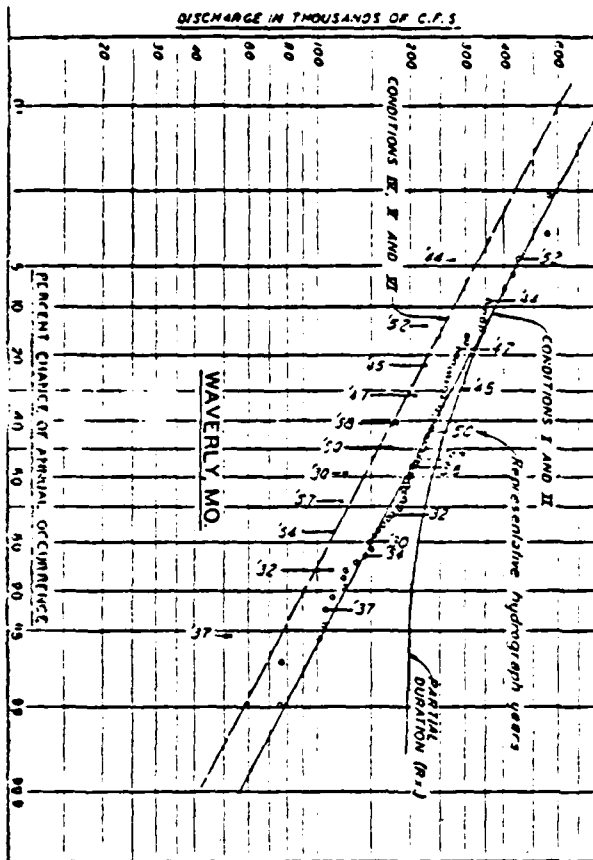
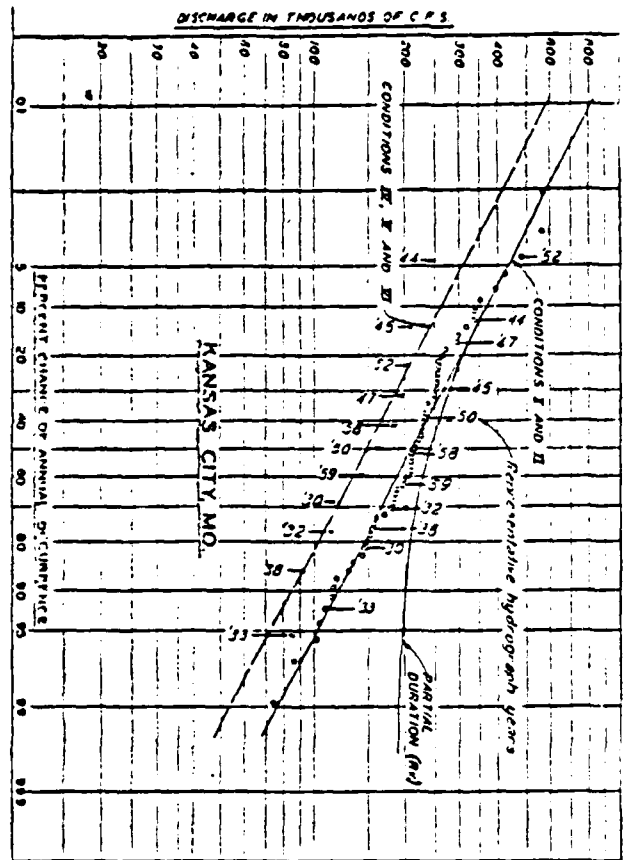
Please refer to our response number 29 to EPA's similar comment.

Thomas A. Wilne June 14, 1976

FLOW PROBABILITY CURVES

EXHIBIT I





SOURCES OF INFORMATION

EXHIBIT II

SOURCES OF INFORMATION

The most important sources of information used to complete this Final Environmental Impact Statement, Missouri River Bank Stabilization and Navigation Project, Sioux City, Iowa to the Mouth are listed below. Included is a brief description of the importance of each listed source and their availability and cost to the public, if available.

1. Environmental Protection Agency. 1974. National Water Quality Inventory. 1974 Report to the U. S. Congress. Office of Water Planning and Standards. Used for Water Quality Data. For sale by the Superintendent of Documents, U. S. Government Printing Office, Vol. I \$3.70 and Vol. II \$4.30.
2. Funk, John L. and Robinson, John W. 1974. Changes in the Channel of the Lower Missouri River and Effects on Fish and Wildlife. 52pp. Missouri Department of Conservation, Jefferson City, Missouri. Used for information concerning Aquatic Habitat. Cost: Free.
3. Nebraska Game and Parks Commission. 1973. Nebraska Rare and Endangered Wildlife. Terrestrial Wildlife Division. Nebraska Game and Parks Commission, Lincoln, Nebraska. This publication contains population status data on certain species of wildlife in Nebraska. Cost: Free.
4. U. S. Army Corps of Engineers, Missouri River Division Task Force Group. 1974. Missouri River Bank Stabilization and Navigation Project Working Papers. Missouri River Division, Corps of Engineers, U. S. Post Office and Courthouse, 215 N. 17th Street. This document contains pertinent Economic, Social, Environmental (Biological), and Engineering data concerning the project. This document is available for inspection upon visitation to this office.
5. U. S. Army Corps of Engineers, Omaha and Kansas City Districts. 1974. Missouri River Projects Maps, Sioux City, Iowa to Rulo, Nebraska and Rulo, Nebraska to Mouth (respectively). Omaha District, Corps of Engineers, U. S. Post Office and Courthouse, 215 N. 17th Street, Omaha, Nebraska, and Kansas City District, Corps of Engineers, 601 East 12th Street, Kansas City, Missouri. This document contains pertinent project structure data and is available for inspection upon visitation to the respective district offices.
6. U. S. Army Corps of Engineers, Omaha District. 1975. The Missouri River Main Stem System Environmental Effect Assessments, Vol. I-VII. Omaha District, Corps of Engineers, U. S.

Post Office and Courthouse, 215 N. 17th Street, Omaha, Nebraska. This document contains pertinent Economic, Social, Environmental (Biological), and Engineering data concerning the project and is available for inspection upon visitation to this office.

7. U. S. Army Corps of Engineers, Missouri River Division. 1975. Water Resources Development in Iowa; Kansas; Missouri; and Nebraska. Missouri River Division, Corps of Engineers, U. S. Federal Building 17th and Capitol Street, Omaha, Nebraska. These documents contain data on Corps of Engineers' activities on the Missouri River and are available for inspection upon request from the Omaha District.
8. U. S. Army Corps of Engineers, Omaha and Kansas City Districts. 1974. Missouri River Navigation Charts, Sioux City, Iowa to Rulo, Nebraska and Rulo, Nebraska to Mouth (respectively). Omaha District, Corps of Engineers, U. S. Federal Building, 17th and Capitol Street, Omaha, Nebraska and Kansas City District, Corps of Engineers, 601 East 12th Street, Kansas City, Missouri. This document contains pertinent navigation data and is available for inspection upon visitation to this office.
9. U. S. Army Corps of Engineers, Omaha District. 1976. Regulatory Permits for the OPPD Nebraska City Power Unit No. 1. Omaha District, Corps of Engineers, U. S. Federal Building, 17th and Capitol Street, Omaha, Nebraska. This document contains Economic, Social, Environmental (Biological) and Engineering data on the project area and is available for inspection upon request from the Omaha District.
10. U. S. Department of Interior, Geological Survey. 1970. The National Atlas of the United States of America, Washington, D. C. This document provides climatic information in the project area and is available for inspection upon visitation to this office.
11. U. S. Army Corps of Engineers, Missouri River Division, 1970. The Missouri River in the 70's. This document contains the historical and present-day settings of the project. See Exhibit 2.
12. U. S. Army Corps of Engineers, Omaha District. 1969. Missouri River Channel Regime Studies, MRD Sediment Series No. 13B. This publication contains information on the bed formations in the Missouri River, and correlates various hydraulic parameters with changes in water temperature and is available for inspection upon visitation to this office.
13. U. S. Army Corps of Engineers, Omaha District. 1971. Velocity Trends, Missouri River Navigation Channel. This publication correlates the changes in the velocity in the Navigation channel with time and discharge over the past 20 years at several locations

along the navigable channel and is available for inspection upon visitation to this office.

14. U. S. Army Corps of Engineers, Missouri River Division. 1957; 1965; 1970; and 1972. Suspended Sediment in the Missouri River, Daily Record for Water Years 1937-1948; 1949-1954; 1955-1959; 1960-1964; and 1965-1969. These publications record the suspended sediment load in the Missouri River at the gaging stations from 1937 thru 1972. These documents are available for inspection upon visitation to this office.
15. University of Missouri - Rolla. 1974. A Base Line Study of the Missouri River: Rulo, Nebraska to Mouth near St. Louis, Missouri. Vol. I-VII. Missouri River Division, Corps of Engineers, U. S. Post Office and Courthouse, 215 N. 17th Street, Omaha, Nebraska. This document contains Economic, Social, Environmental (Biological), and Engineering data on the project. This document is available for inspection upon visitation to this office.
16. University of South Dakota. 1974. A Base Line Study of the Missouri River: Sioux City, Iowa to Rulo, Nebraska. Vol. I-VII. Missouri River Division, Corps of Engineers, U. S. Post Office and Courthouse, 215 N. 17th Street, Omaha, Nebraska. This document contains Economic, Social, Environmental (Biological), and Engineering data on the project. This document is available for inspection upon visitation to this office.
17. Young, Gordon. 1971 (September). "That Dammed Missouri River." National Geographic. Vol. 140, No. 3, pages 374-413. National Geographical Society, Washington, D. C. This document contains the present-day setting of the Missouri River along its entire reach. Cost: \$1.00 (1971).

The following documents were used for economic data concerning the project and are available for inspection upon visitation to the Economic Branch of the Missouri River Division, Corps of Engineers, U. S. Post Office and Courthouse, 215 N. 17th Street, Omaha, Nebraska.

1. Work Sheets: Lower Missouri River Survey - 1950, Weighted Average Line Haul Waterway Rate Elements, 15 sheets, 3/13/50
2. TENTATIVE REPORT ON THE TRANSPORTATION ECONOMICS PHASE OF THE MISSOURI RIVER SURVEY OF 1950, Omaha, NE, 4 May 1950, BERN
3. REPORT ON MISSOURI RIVER CHANNEL STABILIZATION AND NAVIGATION PROJECT, SIOUX CITY TO MOUTH, APPENDIX III, BENEFITS, Missouri River Division, 28 July 1950
4. Memo: Status of Sioux City to Yankton Navigation Project Studies, 22 September 1954, to Div. Eng. From Chief Engr Div. (w/o incs)

5. Memo: 1950 Report on Missouri River Channel Stabilization and Navigation Project -- Summary of Modifications Made Prior to Completion of Report in Estimates of Prospective Commerce and in Estimates of Navigation Benefits, 24 Febr. 1959, To Files, From Chief, P&R Branch
6. MISSOURI RIVER NO. DAK., SO. DAK. & NEBR. NAVIGATION ECONOMIC SURVEY, BASE-YEAR NAVIGATION BENEFITS, Prepared for Omaha District, August 1962.
7. MISSOURI RIVER NAVIGATION STUDY, SIOUX CITY TO YANKTON (GAVINS POINT DAM) ECONOMIC REPORT, BERH for Omaha Dist., November 1962 (Rev. December 1962)
8. PRELIMINARY NAVIGATION ECONOMIC SURVEY - PROPOSED EXTENSION OF NAVIGATION ABOVE SIOUX CITY, IOWA, TO THE MONTANA-DAKOTA STATE LINE VIA EITHER THE MISSOURI RIVER OR THE JAMES RIVER, BASE-YEAR NAVIGATION BENEFITS, Prepared for Omaha District, December 1962
9. Work Sheets: Land Transportation Rates ... Sioux City, Iowa-Yankton, S.D., 13 Dec 1963; (Same) 18 June 1963; Estimated Average Terminal Transfer-Handling Charges, Based on One-Way Transfer, Between Barges and Terminal, Rail, or Truck, 1 June 1963
10. KANSAS RIVER NAVIGATION, LAWRENCE TO MOUTH, REVIEW REPORT AND APPENDICES, Kansas City District, May 1971 (No. 92)
11. SOME ASPECTS OF THE DEVELOPMENT OF NAVIGATION ON THE MISSOURI RIVER AND OF ITS RELATED IMPACT ON MANUFACTURING ACTIVITIES, Jacqueline H. Desbarats, December 1972.
12. Working Papers: Missouri River Bank Stabilization and Navigation Impact Statement, MRD, April 1975, (note OBERs-E Projections not used)
13. Memo: Draft of Board Report - Missouri River, No. Dak., So. Dak. & Nebr., to OCE, 1965 (?); Missouri River Report - Reanalysis of Traffic and Transportation Savings, Memo for Record, ENGBR, 23 November 1965
14. RIVER NAVIGATION - SIOUX CITY TO YANKTON: A CRITICAL APPRAISAL, TO BERH, By a Committee of South Dakota and Iowa Railroads (Tec-Search, Inc.), 6 January 1966
15. Memo: Channel Stabilization and Navigation Project Benefits, To Army Audit Agency, From MRDED-B, 8 Apr 1966
16. Memo: Analysis of Traffic and Transportation Savings for Missouri River Navigation, Sioux City, Iowa, to Yankton, South Dakota (Analysis of above report by Tec-Search), BERH (?), 1966 (?)

17. Memo: Economic Analysis of Missouri River Navigation, Sioux City, Iowa to Yankton, So. Dak., To Members BERH, ENGBR, 2 May 1966
18. Letters: ENGBR to Tec-Search, 24 Oct 1966; Tec-Search to ENGBR, 14 Nov 1966; ENGBR to Tec-Search, 16 January 1967
19. DF: Survey Report on Missouri River in No. Dak., So. Dak. & Nebr. — Contemplated Studies by Department of Agriculture, To Division Engineer, From Planning Division, 14 July 1967
20. Letter: Missouri River in North Dakota ... Review Report, Econ. Data. 3-1/4% Int., MROGR-A to Division Engineer (trans. Savings)
21. DF: Review Report, Missouri River in North Dakota ... Est. Trans. Savings, MRDPD-E to File, 29 August 1967
22. CURRENT ANALYSIS OF PROPOSED EXTENSION OF THE EXISTING BANK STABILIZATION AND NAVIGATION PROJECT UPSTREAM ON THE MISSOURI RIVER FROM SIOUX CITY, IOWA TO GAVINS POINT DAM, SO. DAK. 1967 (?), pages 1, 16, 17
23. AN ANALYSIS OF RAIL, TRUCK, PIPELINE, AND BARGE TRANSPORTATION IN THE MISSOURI RIVER BASIN, Midwest Research Institute, 13 Oct 1967, Vol. I & II
24. MISSOURI RIVER BANK STABILIZATION AND NAVIGATION PROJECT, SIOUX CITY - MOUTH, REPORT ON PROJECT COST ESTIMATE, Missouri River Division, Oct. 1967
25. AN EVALUATION OF ALTERNATIVE TRANSPORTATION MODES FOR SOUTH DAKOTA GRAIN SHIPMENTS, 1966, 1970, and 1975, Fibers and Grains Branch, Marketing Economics Division, Economic Research Service (U.S.D.A.) November 1967
26. Commercial Navigation Statistics, Omaha District, 1961-74
27. IMPROVEMENT OF THE MISSOURI RIVER FOR NAVIGATION, Kansas City Dist. Rev. 1946
28. IMPACT OF WATER DEVELOPMENT ON MINERAL INDUSTRIES OF THE MISSOURI RIVER BASIN, Bureau of Mines, U.S.D.I. Prelim. Report 178, June 1970
29. Wilhelm, John T. "Delimitation of the Omaha Wheat Source Supply Region" 1968 (Wheat Trade and Marketing - Primarily Rail and Truck); Masters Thesis, University of Nebraska-Omaha
30. Page, James "Commodity Origin and Destination of Barge Traffic for the Upper Missouri River" 1972; Masters Thesis, University of Nebraska-Omaha

LETTER TRANSMITTED TO THE REGIONAL DIRECTOR
OF THE MIDWEST REGION NATIONAL PARK SERVICE
FOR COMMENTS FOR INCLUSION IN DEIS
LETTER RESPONSES TO INQUIRIES ABOUT
IMPACTS OF THE PROPOSED ACTIONS ON
ARCHAEOLOGICAL RESOURCES

EXHIBIT III

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18 December 1975

Mr. Merrill D. Beal
Regional Director
Midwest Region
National Park Service
1709 Jackson Street
Omaha, Nebraska 68102

Dear Mr. Beal:

The U. S. Army Corps of Engineers, Missouri River Division, is compiling an Environmental Impact Statement for the operation and maintenance of the Missouri River Bank Stabilization and Navigation Project, Sioux City, Iowa to the mouth.

The Missouri River Bank Stabilization-Navigation Project from Sioux City, Iowa to the mouth is a multi-purpose river development project. Project purposes include navigation, bank stabilization and recreation. The existing Missouri River Bank Stabilization and Navigation Project authorized by the River and Harbor Act of 1945, described in House Document 214, 76th Congress, 1st Session, 2 March 1945, provides for a continuous 9-foot navigation channel, 300 feet wide, extending from its Mouth to Sioux City, Iowa. This Act modified earlier congressional authorizations in 1912 and 1927 that had provided for a 6-foot deep, 200-foot wide channel from the mouth to Sioux City. The project is of the open-river regulation-type which utilizes the energy of the flowing water to develop and maintain a controlled navigation channel area.

The river channel is now stabilized in its designed course throughout its 722-mile length. The project was considered to be 88 percent complete as of July 1974. The remaining work consists of refinement structures to secure and maintain full project dimensions. The project has a controlling depth of 8.5 feet and a 250-foot width from Sioux City to Rulo, Nebraska; a controlling depth of eight feet and a 220-foot width from Rulo to Kansas City and a controlling depth of 7.5 feet and a 250-foot width from Kansas City to the mouth, as determined from recent hydrographic surveys.

E. III-1

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STATE HISTORICAL DEPARTMENT OF IOWA
DIVISION OF HISTORIC PRESERVATION

ADRIAN D. ANDERSON, DIRECTOR
HISTORIC PRESERVATION OFFICER

December 5, 1974

Mr. Gene Galloway
MRD-PD-ER
Missouri River Division
Corps of Engineers
Box 103 DTS
Omaha, Nebraska 68101

Re: EIS Missouri River Bank Stabilization and Operation

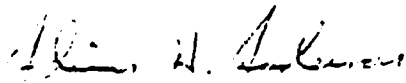
Dear Mr. Galloway:

I have received our records for historic and archaeological sites in the Missouri River floodplain, pursuant to your request. We have very little information to offer since no professional surveys have been conducted in the area you are concerned with. Since the Missouri River valley was occupied for more than 10,000 years there is every reason to expect that a larger number of prehistoric sites exist on the floodplain. The same reasons for prehistoric human utilization of the floodplain caused early Euro-American settlers to choose that same area, so there should be Trading Posts, Mission-sites, and early cabin sites. The heavy river traffic also resulted in a high number of river boats, such as the Bertrand, being wrecked and buried.

Future operations and stabilization plans should take the possible presence of such socially and scientifically important historic resources into account; intensive surveys of project areas must be conducted.

The Division of Historic Preservation will give all possible assistance to insure that project areas are properly surveyed.

Sincerely,



Adrian D. Anderson, Director
State Historic Preservation Officer

ADA:pas

E. III-2

Kansas State Historical Society

1014 AND JACKSON STREETS TOPEKA, KANSAS 66612



PHONE (913) 296-3251

NYLIE H. MILLER	Executive Director
EDGAR LANGSDORF	Deputy Director
MRS. GEORGE T. HAWLEY	Librarian
ROBERT W. RICHMOND	State Archivist
STANLEY D. SOHL	Museum Director
THOMAS A. WITTY	Archaeologist
JOSEPH W. SNELL	Curator, Manuscript Division
FORREST R. BLACKBURN	Curator, Newspaper-Census Division
RICHARD D. PANKRATZ	Historic Site Survey
BLANCHE E. TAYLOR	Office Manager

December 3, 1974

Mr. Gene Galloway
Missouri River Division
Corps of Engineers
P. O. Box 103 DTS
Omaha, Nebraska 68101

Ref: Maintenance and operation
EIS for bank stabilization
and navigation project

Dear Mr. Galloway:

In response to your phone call to Tom Witty of our staff concerning cultural resources within the Missouri River channel and flood plain area, we have the following comments.

Archaeological interest in the Missouri trench bordering Kansas has a long history. Some of the earliest descriptive reports dealing with pre-historic sites are from the Leavenworth area in the 1830's. The interest of both amateurs and professionals has been concentrated on the bluff tops and intersecting valleys. Their findings demonstrate a long and varied cultural tradition in that region. More recently some highway corridor studies, as well as specific drainage investigations, have determined that few if any sites still exist on the flood plain proper adjacent to the channel.

Generally speaking the nature of the erosion processes which are active on the channel and flood plain do not permit extensive preservation of historic or archeological remains. Worthy of mention, however, are some of the "islands" which served as camps or cantonments during the early historic period. Such islands would be Isle au Vache or Cow Island, Isle des Parques and "Bear Madecin" or Kickapoo Island. While it might be assumed that any historic or prehistoric habitational remains on those islands would have been scoured away by flooding, no specific investigations have been made to determine if this were true. Such "islands" should be investigated if proposed channel changes or alterations would affect these areas.

E. III-3

OFFICERS: President, A. J. Stanley, Jr., Leavenworth; 1st Vice-President, Homer E. Secor, Manhattan; 2nd Vice-President, John E. McManis, Emporia; Secretary, Nydie H. Miller, Topeka; Treasurer, Edgar Langsdorf, Topeka.
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Mr. Galloway

2

12/3/74

While sites would appear to be scarce on the flood plain, there is the possibility of "objects" being present. Perhaps the most spectacular of these would be sunken steamboats dating from the 19th century. A quick review of a report by Captain H. M. Chittenden in 1897 located at least 38 wrecks in the trench which borders Kansas. Recent work in the Nebraska area with the steamboat Bertrand demonstrated that cargo on such wrecks could be in an excellent state of preservation and these wrecks could be very significant historical and archeological discoveries. Currently there are private investigations in Wyandotte county on the wreck of the steamboat Arabia. Certainly any maintenance operations which involved channel changing should be aware of the possibility of such objects being exposed.

Presently there are no properties in the Missouri river channel and flood plain which are entered on the National Register.

With kindest regards and best wishes, I am

Cordially,

Nyle H. Miller

Executive Director and
State Historic Preservation Officer

NHM:mf

University of Missouri - Columbia



Room 22 Switzler Hall
Columbia, Missouri 65201

COLLEGE OF ARTS AND SCIENCE
Archaeological Survey

Telephone
314-882-8364

November 11, 1974

Mr. Gene Galloway
Missouri River Division,
Corps of Engineers
P.O. Box 103 DTS
Omaha, Nebraska 68101

Dear Mr. Galloway:

In reference to your telephone call requesting information on the impact of projects in the Missouri River Flood Plain on archaeological resources, I can offer the following information.

As you are aware, the evaluation of existing records was made in 1972 and reported in the Missouri River Environmental Inventory, from Rulo, Nebraska to the mouth, near St. Louis, Missouri by the Knasas City District. Of the known archaeological resources within the flood plain in the adjacent hill-top of bluff areas of the river, there are only a few known archaeological resources that are on the flood plain itself. One of them, near Weston, Missouri is on the National Register of Historic Places. Thus there is evidence that archaeological resources do occur in the flood plain, although most known archaeological sites are on a terrace near the mouth of where a stream has its confluence with the flood plain. Sites in the flood plain would be most readily disturbed if levy work were conducted within the flood plain and areas where levys are considered should be evaluated for archaeological resources. No systematic archaeological survey has been conducted along the flood plain of the Missouri River for any distance.

Insofar as structures in and along the banks of the Missouri River, such as revetments and erosion controlling structures within the River itself, little or no impact would be felt by any archaeological resources in the area. Should archaeological resources be within the river itself, these resources would be largely unidentifiable and non-recoverable by normal archaeological techniques.

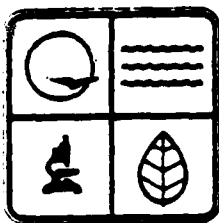
If we may be of assistance in evaluating a specific project as they are being planned, specific evaluations for archaeological survey, testing, or excavation, we will be happy to submit a proposal at that time.

Sincerely yours,

David R. Evans
Director

DRE:lw

E. III-4



M I S S O U R I
DEPARTMENT OF
Natural Resources

CHRISTOPHER S. BOND
GOVERNOR

JAMES L. WILSON
DIRECTOR

P.O. Box 178

Jefferson City, Missouri 65101

314-751-3332

November 25, 1974

Mr. Gene Galloway
Task Force Member, Department of the Army
Missouri River Division, Corps of Engineers
P. O. Box 103, Downtown Station
Omaha, Nebraska 68101

Dear Mr. Galloway:

In response to your letter of November 4, 1974, asking for information on historic/cultural resources along the Missouri River, I am enclosing a listing of National Register sites which are located near the Missouri River flood plain.

It is unlikely the project will affect any known archaeological sites as long as the project is contained within the river channel. I should point out that dredging activities can destroy underwater archaeological sites, such as sunken boats, steamboat wrecks, or boats involved in military operations during the Civil War. Hence, if such a wreck is found during dredging projects the Corps or its sub-contractors should notify the National Park Service for an investigation.

The Missouri River is bordered by numerous campsites of early explorers and settlers - such as the Lewis and Clark Expedition of 1804. One of these campsites, the Tavern Cave, is listed on the National Register. Others need to be studied and nominated. Actually our list of current National Register listings in the vicinity of the Missouri River does not reflect the anticipated future number of listings which will be achieved after further survey and study of this important, historic transportation artery in Missouri.

Please let this office know if further information is needed. Thank you for giving us an opportunity to comment on your project.

Sincerely,

STATE HISTORICAL SURVEY AND PLANNING OFFICE

M. Patricia Holmes

(Mrs.) M. Patricia Holmes
Research Associate

MPH:mvs

E. III-5

Enclosure: List of National Register sites along the Missouri River
Flood Plain

Division of Parks and Recreation • Division of Environmental Quality • Division of Administrative Services
Division of Research and Technical Information • Division of Planning and Policy Development

Missouri's National Register sites occurring on or near the Missouri River Flood Plain - as of November, 1974.

Buchanan County

Market Square Historic District - St. Joseph
Missouri Valley Trust Company Historic District - St. Joseph
(pending entry)

Platte County

Weston Historic District
Babcock Site, 3 miles North of Waldron

Jackson County

Fort Osage
Fort Osage Archaeological District

Saline County

Gumbo Point Archaeological Site, 3 miles Northwest of Malta Bend
Plattner Site, Vicinity of Malta Bend

Howard County

Rivercene, near U.S. 40 and the Missouri River Bridge

Cole County

Lohman's Landing, Jefferson City at foot of Jefferson Street
Missouri State Capitol Historic District, Jefferson City (Pending entry)
Gay Archaeological Site, Osage City vicinity

Callaway County

Cote Sans Dessein, Vicinity of Tebbetts

Gasconade County

City of Hermann Historic District

Franklin County

Tavern Cave, near St. Albans

St. Charles County

St. Charles Historic District
Missouri First State Capitol, St. Charles
Stone Row, St. Charles
Newbill-McElhiney House, St. Charles

